



Digital Health Trends

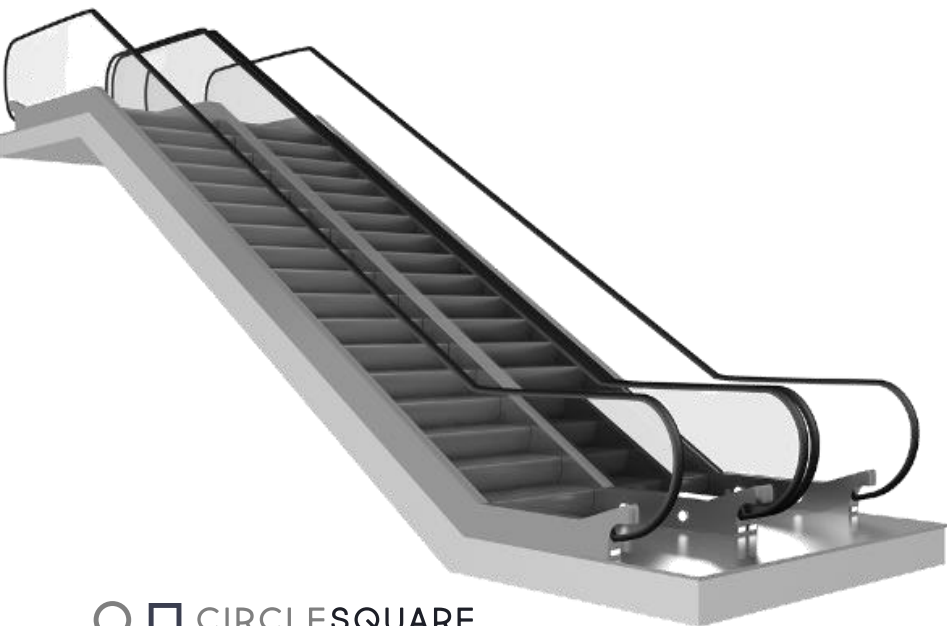
June 2023



HEALTH INFORMATION TECHNOLOGY – CONSUMER HEALTH & TECHNOLOGY

The Ups and Downs of Digital Health

Digital Health Trends
June 2023



From the co-editors...

Interoperable EHRs

In the global EMR market, Softway and Dedalus are up with best 2022 market performance focused on Europe. The global imaging market is up post-pandemic with double digit growth ahead and \$5.2b in 2022. In the US, Nuance and Iodine are leaders in the clinical documentation integrity market. And primary value-based care is way up with CMS releasing its Make Care Primary model in eight states.

Healthcare Analytics

Azara was identified by KLAS Research as having the secret sauce in pop health analytics for value-based care, with Epic and Innovaccer most well-rounded. New LLMs are up with NYU demonstrating an all purpose prediction engine and MIT and Tufts speeding drug discovery. Analysis of AI patents in healthcare shows China leading and radiology the most popular domain. And astoundingly, generative AI can reconstruct video from brain activity captured in fMRI scans.

Consumer Health and Technology

Digital therapeutics had a mixed month. AVIA named their top DTx solutions (Xealth was tops), while DTx unicorn Pear Therapeutics filed for bankruptcy. Rock Health examines the company's barriers to commercial success. Telehealth is up this month as KLAS looks at virtual care platform purchase decisions while a study of FQHCs in California finds continuing value in audio-only telehealth services.

Et Cetera

Funding for the first three months of 2023 was tallied at \$3.4 billion across 132 total deals but with six mega deals accounting for 40% of the total. New reports look at the digital health portfolios of US health systems as well as the success rate of partnerships between startups and healthcare companies. And a Kaiser Family Foundation report offers ten things to know about the unwinding of the Medicaid continuous enrollment provision.

*Michael Lake and Dave Lake
Co-editors Digital Health Trends*

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Four steps to successful value-based payment

The Center for Connected Medicine (CCM) looks at the state of the market for AI

NYU shows its language models are all-purpose prediction engines

MIT and Tufts built a new model that offers a way to speed up drug discovery

Analysis of AI patents in healthcare shows China leading and radiology the most popular domain

Innovations in clinical AI include support for diagnostics for breast cancer, Alzheimer's, heart failure, cardiac disease, small lesions, and gingivitis

Generative AI reconstructs video from brain activity

Transactions in analytics segments include value-based care, clinical research, rev cycle, and drug diversion

Consumer Health and Technology

Large European study underlines power of genomic sequencing to diagnose developmental disorders

Healthcare headlines from non-healthcare companies

KLAS: Integration and consolidation are driving telehealth strategies

Study finds continuing value in audio-only telehealth services

Four startups focused on increasing women's pelvic floor health awareness

Why are there so few scaled consumer marketplace businesses in healthcare?

Retail health clinic use skyrocketed during the pandemic, but growth is expected to slow

Nearly every hospital website is sharing visitor data with a variety of companies

DTx pioneer Pear Therapeutics files for bankruptcy; a look at what went wrong

AVIA names the top digital therapeutics for 2023

Patient satisfaction is the most important measure of a successful patient financing services firm

Aktiia's blood pressure wearable matches cuff in new study

Orthopedic implants are the latest piece of 'smart' medical tech

M&A and partnerships in consumer health segments

Funding highlights in consumer health segments

Et Cetera

Q1 digital health funding: Six mega deals accounted for 40% of the total

Just 13% of partnerships between startups and healthcare companies are successful

New report looks at the digital health portfolios of US health systems

Ten things to know about the unwinding of the Medicaid continuous enrollment provision

Realizing the potential of accountable care in Medicaid

A large, flowing graphic composed of many overlapping teal lines that create a sense of movement and depth, resembling a stylized wave or a digital signal. It starts from the left and curves across the middle of the slide.

Electronic Health Records

Dedalus, Oracle, IQVIA, Softway, and CGM are notable in non-US EMRs



Multiregional leaders

Dedalus has grown significantly through acquisitions in the last five years, and their platforms continue to be widely considered and selected (chosen across nine countries in 2022). Their 2022 acquisition of Lutech’s Hospital platform in Italy (34 hospitals) accompanied strong growth in DACHL and France. They were also selected for a health region in Morocco.

Oracle Health (who acquired Cerner) had a strong year of EMR wins. They were contracted for the third-highest number of beds thanks to large multihospital decisions in their favor—for Millennium in Canada, the UK, and the UAE; for i.s.h.med in Germany.

IQVIA had a strong year in Asia thanks to two large contracts in India, including a state health department Europe continues to lead the global EMR activity, driven by increased funding and regional consolidation of public health systems.



Regional leaders

Europe continues to lead the global EMR activity, driven by increased funding and regional consolidation of public health systems.

Softway Medical had another strong year in France and Belgium, as did CompuGroup Medical (CGM) in Central and Eastern Europe.

As of 2022, MV remains the most widely selected solution in Latin America across the last five years. Philips is the second most selected solution in the region, and TASY has been chosen by increasingly large organizations in the past three years.

System C rounds out the top five regional vendors in 2022 selections, thanks to a contract with the UK’s largest private hospital group








Hospital beds contracted in 2022

| | Vendor | Beds |
|----|--------------------|--------|
| 1 | Softway Medical | 17,805 |
| 2 | Dedalus | 9,436 |
| 3 | Oracle Cerner | 7,564 |
| 4 | CompuGroup Medical | 6,039 |
| 5 | IQVIA | 5,803 |
| 6 | MV | 4,309 |
| 7 | Philips | 3,486 |
| 8 | InterSystems | 2,876 |
| 9 | System C | 2,706 |
| 10 | Epic | 2,564 |
| 11 | ezCaretech | 2,376 |
| 12 | Maincare Solutions | 2,222 |
| 13 | Meditech | 2,027 |

Editorial: In 2022, KLAS validated 164 EMR purchase decisions impacting 532 hospitals and over 82,000 beds. 30 different vendors in 31 different countries were selected. While 2022 had the lowest validated EMR purchase activity of the last five years, certain markets remained highly active—specifically, Europe and Latin America and, to a lesser extent, Asia and the Middle East. Canada and Oceania, while relatively quiet in 2022, are poised for significant activity in 2023 due to major contracts on the horizon.

KLAS Research takes a closer look at five popular ambulatory EHR suites

| |  C+ |  D+ |  B |  F |  C |
|------------|--|--|---|---|--|
| STRENGTHS | <p>Broad technology platform for provider orgs who want a comprehensive tech partner</p> <p>Well-developed clinical specialty content and workflows</p> <p>Products that are highly flexible and customizable to customers' needs</p> <p>Proven scalability across practice sizes</p> <p>Strong integration among NextGen products</p> | <p>Smaller customers are more highly satisfied with the vendor</p> <p>Solutions can be customized to fit customers' needs</p> <p>Customers are highly satisfied with the reporting features for EMR/PM solutions</p> | <p>Unique pricing model is a key driver of value for customers</p> <p>Strong EMR/PM functionality has led to multiple Best in KLAS awards</p> <p>Strong integration between athenahealth products</p> <p>Customers can effectively run practices by nearly exclusively using vendor's robust HIT</p> <p>Vendor is seen as driving technology and innovation forward</p> | <p>Customers appreciate the low price point</p> <p>Large number of available functionalities</p> <p>Software caters to many specialty provider organizations</p> | <p>Customers report strong usability and ease of use</p> <p>Recent improvements to support (historically an issue) are boosting customer satisfaction</p> <p>Patients highly satisfied with strong patient portal performance</p> <p>Customers highly satisfied with integration between core Greenway Health solutions</p> |
| WEAKNESSES | <p>Significant number of customers feel nickel-and-dimed</p> <p>High dissatisfaction with Medfusion Patient Portal due to many issues</p> <p>Software maintenance can require a high number of internal IT resources</p> <p>Initial and ongoing training doesn't set customers up for success</p> <p>Noticeable recent decline in the quality and proactivity of support</p> | <p>Customers complain about the vendor relationship and lack of support</p> <p>Many customers report that lack of training makes it hard to overcome software complexity</p> <p>Many customers feel nickel-and-dimed</p> <p>FollowMyHealth is difficult to use on the patient side</p> | <p>Some customers note insufficient training lowers their ability to effectively use all functionality</p> <p>Some customers report solution bugs</p> <p>Weaker-than-expected frontline support and extended resolution times impact customer satisfaction</p> <p>Vendor's many EMR/PM solutions lead some customers to feel overlooked in development</p> | <p>Long turnaround times, unresolved issues, and undelivered promises</p> <p>Lack of effective training impacts customers' ability to use functionality</p> <p>Integration issues prevalent throughout all vendor offerings</p> <p>Nickel-and-diming for functionality customers feel should be included</p> <p>High number of bugs/issues that disrupt workflow and efficiency</p> | <p>Support lacking knowledge and long resolution times over past years</p> <p>Implementation issues widely reported by customers</p> <p>Customers want more involvement in developing future road map</p> <p>Customers want stronger vendor investment in product development</p> <p>Inconsistent results from RCM services a sore point</p> |

Editorial: KLAS Research released "closer looks" at five key ambulatory EHR suites focusing on solution performance of various components and overall (see letter grades above), as well as strengths and weaknesses of each, also highlighted above. These five vendors represent approximately 40% of the US market. Epic is the market leader with an estimated 15%-18%. It's notable that at one time each of these solutions led the pack as being number one or two in terms of performance, in the midsize and below segments. Epic has led the large group market for many years, although athenahealth is currently leading the large group practice management segment for performance.

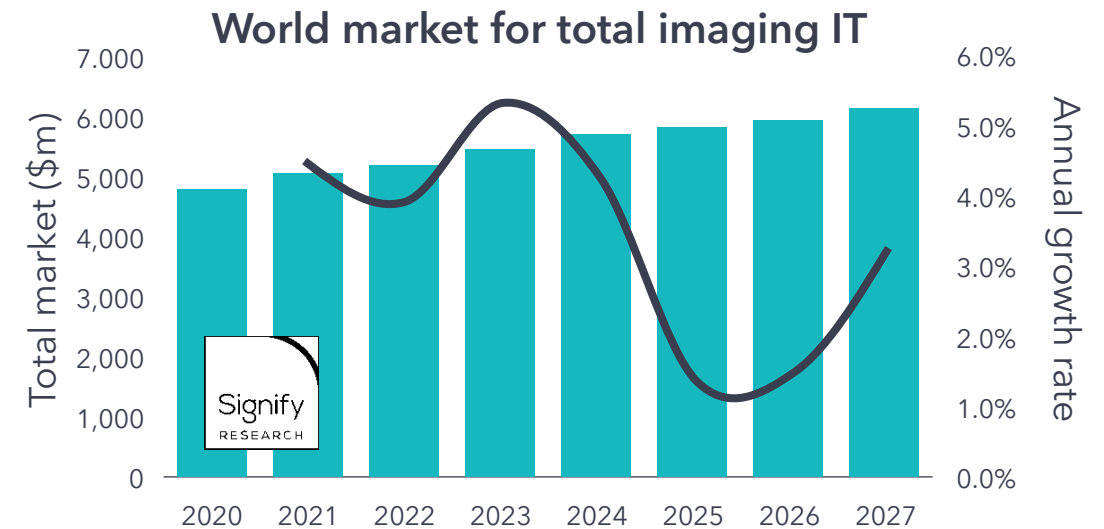
As the pandemic fades, the global market for imaging IT has hit \$5.2b in 2022

The short-term outlook is expected to offer an abundance of opportunities for vendors, with the tail-end of a US radiology IT market replacement cycle, public investment bolstering markets in Western Europe and Latin America, and the Middle Eastern region ripened for double digit growth.

Beyond the strong growth prospects short-term, vendors must turn attention to 2025 onwards. Many markets globally are anticipated to encounter risk, whether that aligns to political elections, implications from the Russia / Ukraine war, or the ongoing economic instability offered by the global crisis. Rebuilding sales pipelines at the latter end of the forecast period is going to be unpredictable.

To mitigate future risk, alongside tackling increased business and staffing costs, vendors are evaluating and implementing price increase strategies. Although prospective rises could be between 5-20%, the reality is very context specific by product, customer, and geography. In actuality, it is expected parts of the imaging IT portfolio will be commoditized, such as operational workflow or analytics, so instead of the market inflating from price increases, vendor revenue will be redistributed across its portfolio.

Providers are evaluating vendors, not only on technical competency today, but their roadmaps for delivering long-term strategies such as enterprise imaging, AI orchestration and cloud-native platforms.



Editorial: Annabel Dimmock and Amy Thompson, analysts at Signify Research report that for many global vendors, their dominant markets are competitively saturated, such as Western Europe and North America, the key to securing success will lie in a vendor's ability to deliver on the long-term strategy and accomplish the promised integration across its native, acquired, and partnered IT ecosystem. For those looking towards the lucrative emerging markets, vendors need to act with intention as these markets are high reward, but high-risk.

The market dynamics are shifting for medical and radiation oncology information systems

Amid market consolidation, Epic works to build more robust oncology functionality.

Recent developments, particularly around patient oncology history and treatment plans, have reportedly helped improve patient safety and better fit oncologists' workflows.

Oracle Cerner has been slow with oncology development. Nearly half the users want improved workflows and order set functionality, noting that the system can be difficult to learn and use.

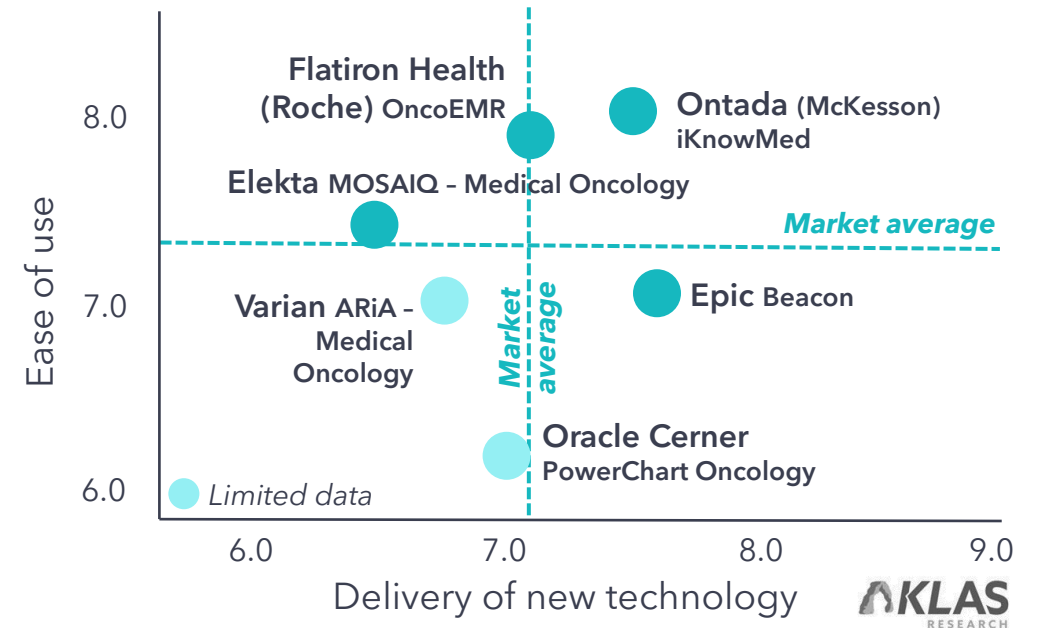
For medical oncology in community centers, Ontada (McKesson) and Flatiron Health maintain strong performance with intuitive products and responsive support.

Ontada iKnowMed customers appreciate the straightforward workflows and oncology-specific functionality, particularly with regimen management. Flatiron Health customers regularly point to OncoEMR product quality, ease of use, and ease of onboarding as the main drivers of satisfaction, particularly appreciating the efficient, oncology-specific workflows.

For medical oncology, Elekta customers see strengthened engagement, while Varian customers report less focus. In recent years, customer satisfaction with Varian's radiation oncology EMR has consistently trended upward. Specifically, respondents appreciate improved response times and knowledge from support resources.

For radiation oncology, Varian customers see overall improvement; Elekta customers report little progress

Modern technology that is easy to use



Editorial: KLAS Research finds that the market for both medical and radiation oncology EMRs is shifting. For medical oncology, many previously independent oncology practices and cancer centers have been consolidated into larger health systems, leading to the adoption of medical oncology modules from acute care EMR vendors, a trend that is set to continue. KLAS interviewed 158 organizations about the performance of medical and radiation oncology EMR vendors to see which are meeting customer needs and which are falling behind. More information about the report is linked below.

Digital assistants support physician EMR documentation and precision medicine



Microsoft-owned Nuance Communications sells its AI medical scribe platform to health care providers on a simple promise: If they spend over \$1,000 per copy for the high-tech product, they can decrease doctor burnout and ultimately make more money by enabling doctors to see more patients.

But executives at four health systems using the software, called DAX, report that while the software might make it possible to see more patients, or justify higher charges to insurers for visits, the high price tag means it's certainly not boosting their bottom lines.

Companies like Augmedix, Abridge, Suki, and others are offering more flexible solutions that are starting to attract some of Nuance's business. Suki reports it will charge \$399 per user per month, while Augmedix Go will be priced under \$300 a month.



Hybrid primary care company Carbon Health has debuted hands-free charting in its proprietary EHR, using GPT-4 artificial intelligence technology to craft patient visit summaries.

After the patient consents, the provider presses record in the EHR and Amazon Web Services Transcribe Medical transcribes the visit. The notes are combined with other patient data such as demographics and lab results, and a visit summary is auto-generated by OpenAI's GPT-4 hosted on Microsoft Azure before being finalized by the provider.

Carbon Health, which received a \$100 million infusion from CVS Health Ventures in January, has more than 125 clinics across 13 states and also offers virtual care. The company also plans to license its EHR technology.



Ambience AutoScribe is a fully automated AI medical scribe that captures the nuances of provider-patient conversation in real-time into a comprehensive note.

The workflow for providers is simple. Ambience lives on top of the Elation EHR (among others) as an extension. It automatically syncs with Elation to know which patient a provider is seeing, and it's just a single click to start capturing the visit.

Once the visit is over, the software generates the documentation pretty much instantly. The provider reviews the note in Ambience's interface, makes any edits they need to, and then clicks a single button to have all of it exported into the right parts of the chart in Elation.



Tempus, AI and precision medicine, launches a physician AI digital assistant.

Tempus One is a voice and text assistant – available via the Tempus Hub desktop and mobile app – that is designed to provide clinicians with quick access to their patient's full clinical and molecular profile, along with an array of other datasets, which can be queried by physicians to help inform clinical decisions in real-time.

Through Tempus One, clinicians can, among other things: access new clinical test reports and receive status updates of a patient's report; rapidly filter patient incidence by alteration, gene, or diagnosis; quickly access summarized patient information; review report information on actionable biomarkers; and easily query clinical guidelines for up-to-date standard of care insights.

Editorial: Here is a roundup about physician digital assistants and how the market is evolving. Nuance has been leading a segment and able to price at a premium, but with competition maturing and expanding, prices are starting to come down, and services are improving. We are reporting for the first time on AWS and its Transcribe Medical used with the Carbon Health EMR, and Ambience AutoScribe working with the Elation Health EMR. Tempus One is a new kind of assistant that is linked to their patient's clinical and molecular profile and external informational datasets. AVIA [released](#) a buyer's guide and landscape for providers that includes in-person and remote scribes, tech-assisted with human involvement, and ambient documentation with no human touch. We'll cover it in detail over the Summer.

Nuance and Iodine are leaders in clinical documentation integrity (CDI)

Reporting is a key pain point among CDI users with Nuance and Iodine Software reporting above the industry average

Poor reporting is a common complaint of CDI users—64% of respondents express frustration with the reporting capabilities of their CDI solution. When reporting feels insufficient, users are less likely to feel their solution has the functionality necessary for success.

Nuance customers rate the accuracy of the reporting high and feel they have flexibility in creating reports and displaying data. Users would like Nuance to fill the gaps that exist around reporting for more niche data.

Customers feel that **Iodine Software** current reporting functionality is strong but limited in scope; respondents would like Iodine to expand the reporting capability into broader use cases, such as forecasting.

Reporting has been an ongoing pain point for **Dolbey** customers, mostly resulting from inaccurate data. Though respondents note Dolbey is aware of and working to resolve the reporting issues, they would like to see more proactivity from the vendor.

Organizations using **3M 360 Encompass CDI** also feel that reporting is their biggest problem, with particular issues around financial reporting. A few have had to bring in additional vendors to get the reporting they need out of the system.



CDI vendors: selected data points

| Vendor | Overall | Executive relations | Client base |
|--------------------------|---------|---------------------|-------------|
| Nuance CDI | 90.6 | 8.2 | 100+ |
| Iodine Software AwareCDI | 90.2 | 8.6 | 51-100 |
| 3M MModal CDI | 81.5 | 7.6 | 51-100 |
| 3M 360 Encompass CDI | 81.2 | 7.7 | 100+ |
| -----Limited data----- | | | |
| AGS Health CDI | 89.9 | 8.4 | 10-25 |
| Dolbey Fusion CDI | 88.6 | 8.3 | 26-50 |
| Optum Optum 360 CDI 3D | 75.3 | 7.6 | 51-100 |

Editorial: KLAS Research finds that for many healthcare organizations, the need to improve clinician satisfaction and effectiveness is top of mind. To help with that goal, those using clinical documentation integrity (CDI) solutions are looking to their vendor partners for innovation to aid in increased documentation efficiencies. KLAS interviewed 149 organizations about the performance of CDI vendors, focusing on key elements that drive customer satisfaction such as vendor relationships, driven outcomes, and reporting capabilities.

Transactions in foundational segments focus this month on pharmacy, physician practice support, health operations, and surgical augmented reality

Augmedics

Augmented reality in surgery

\$82.5m Series D

Augmedics developed an AR platform, xvision Spine System, to help surgeons navigate instruments and implants during spine procedures (\$144m total raised); used in 4,000 surgeries, 20k pedicle screw implants

Transaction Data Systems 

Retail pharmacy platform

Merger

Cardinal Health merges its Outcomes pharmacy platform into Transaction Data Systems (BlackRock) now servicing 40K pharmacies, with info systems, workflow, medication therapy management, and patient engagement

Specialty pharmacy care

Strategic investment

Evernorth (Cigna Express Scripts) invests in, and partners with CarepathRx to boost access to specialty pharmacy care via integrated specialty pharmacy services to its 600 healthcare organization customers

MEDMETRIX 

Revenue cycle management

Acquisition

Med-Metrix, PE-backed RCM and business intel services to health systems and physician groups, acquires Tritech Healthcare Management, workers' comp and auto claims for 40 healthcare orgs in NE US market

 helium health

African EMR and fintech

\$30m Series B

Helium Health (Lagos, Nigeria), software-as-a-service tools, financing and insights for African healthcare providers and public health organizations (\$42m total raised); 10k health workers, 1,000 facilities, 1m African patients

 MEDIVIS

Augmented reality in surgery

\$20m Series A

Medivis, AR and AI supporting surgical care, enables overlaying patient-specific MRI and CT data allowing detailed surgical planning and rehearsals for MD Anderson, Providence, UPMC, Northwell, Cincy Children's, VA

 RLIGHTNING

Specialty pharmacy platform

\$17.5 Series A

RxLightning enrolls patients for any specialty medication, brand or generic, at any specialty pharmacy; forms for 1,200 drugs; also automates FDA REMS programs; Novartis, McKesson, Hearst, Onco360, investing



EU practice administration

\$16m Series A

Nelly (Berlin) provides a platform for patient admission, invoicing, and payment, in Europe, that integrates with practice mgmt solutions (\$20m total raised); in 450 practices and 350k patients

Editorial: Additional transactions included Laudio, operations for front line managers, [gets](#) \$13m Series B (\$22m total); Fuse Oncology, a spinout of Cone Health in oncology revenue cycle, [gets](#) \$9m Series A; Hypervision Surgical (London), spinout of King's College, [gets](#) \$8m in seed funding for its precision surgical imaging; Stepful, training high school grads in healthcare roles, [gets](#) \$7.5m seed funding; Dock Health, healthcare administrative workflow and task management, [gets](#) \$5m seed round; Wellplaece. automated, multi-vendor supply product purchasing platform for dental offices, [gets](#) \$5m seed funding.



Interoperability and Security



CMS tests a new *Make Care Primary (MCP) Model* in eight states to strengthen primary value-based care

Highlights of the new model

MCP provides primary care clinicians with enhanced model payments, tools, and supports to improve the health outcomes of their patients. It provides additional resources and data to help primary care clinicians better coordinate care with specialists. Additionally, it supports better care integration, meaning that clinicians can more seamlessly address physical and behavioral health needs and tap into community networks to reduce health disparities.

MCP will aim to ensure that patients receive care to meet their health goals and social needs. Patients will receive enhanced support from MCP participants to better manage their conditions and improve their overall wellness.

The model includes three domains

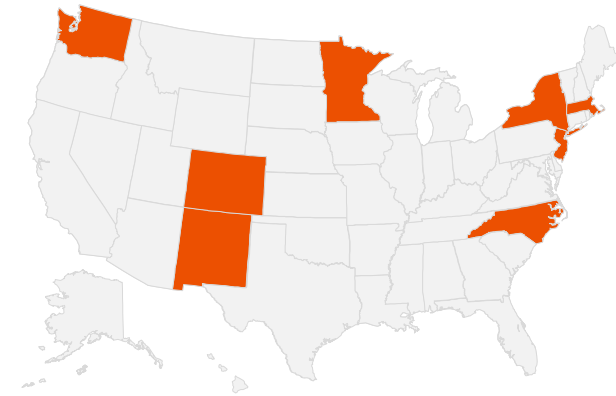
Care Management: participants will build their care management and chronic conditions self-management services

Care Integration: participants will improve their connections with specialty care physicians and use behavioral health screening and evaluation

Community Connection: participants identify and address health-related social needs among their patients and direct them to community resources.

When and where

Model will be tested from July 1, 2024, to December 31, 2024, in Colorado, Massachusetts, Minnesota, New Jersey, New Mexico, New York, North Carolina and Washington.



The model includes three tracks

Building the infrastructure: Foundation for advanced primary care with upfront infrastructure payment and support for improved patient outcomes.

Implementing advanced primary care: half fee for service and half per member per month with upside savings.

Optimizing care and partnerships: Full capitation.

Editorial: The MedCity News reports that the CMS MCP Model will focus on small, independent, rural and safety net organizations and assist them in entering value-based arrangements through enhanced model payments and quality tools; resources for specialist integration; and tools to address patients' physical and behavioral health needs.

Health organization adoption of clinical communications platforms

PerfectServe Telmediq and Stryker Vocera are closest to providing comprehensive deployments that fit customer strategies.

PerfectServe Telmediq customers highlight the vendor's efforts to understand their current workflows and then build interfaces and functionality that closely align. Stryker Vocera Platform's broad capabilities can address customers' specific communication challenges, and some customers highlight close involvement from the vendor to align the technology with their communication strategy.

TigerConnect customer strategies are enabled due to its ease of use.

TigerConnect respondents say the easy-to-deploy, HIPAA-compliant messaging solution meets their needs; they have deployed the fewest interfaces and workflows. Those who implement more workflows note the vendor's willingness to deploy additional interfaces and their versatility in helping organizations with different communication goals and use cases

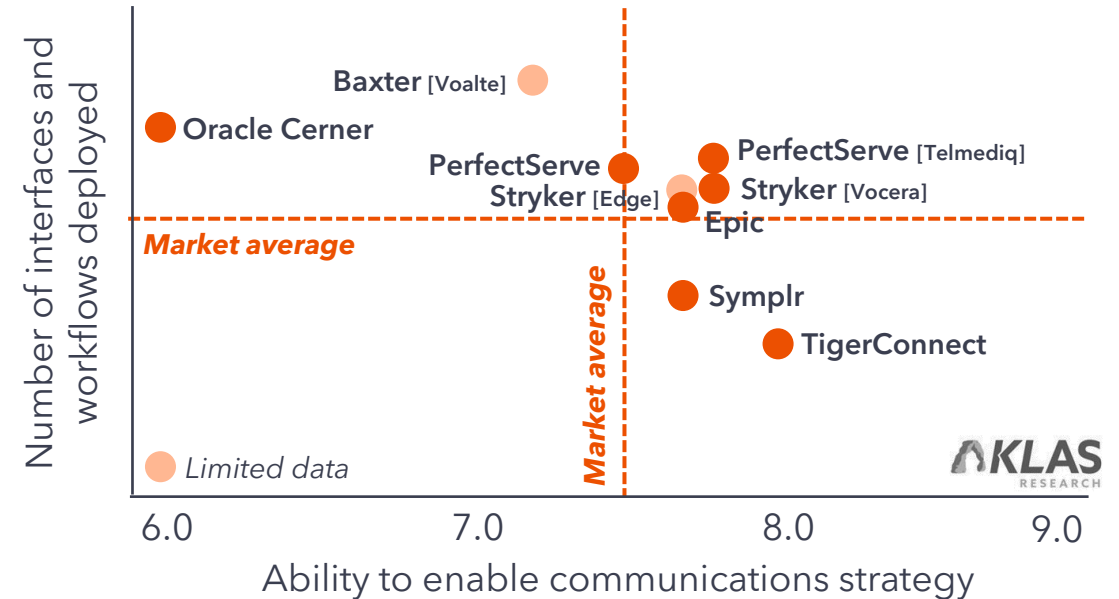
PerfectServe, Stryker Edge and Baxter help drive deep adoption.

PerfectServe has the deepest adoption and Stryker Edge the highest average number of exchanged messages, e.g. one reporting 30m per month

Epic is most broadly adopted while adoption depth varies.

Epic respondents, who are mostly large health systems, report deploying the solution to the highest percentage of hospitals. Because the product is built into the EMR, many customers have rolled out the solution enterprise wide, especially to leverage its EMR integration and telehealth workflows.

Comprehensive deployments that fit comms strategies



Editorial: Past KLAS research shows that clinical communication platforms can improve healthcare organizations' efficiency and care quality when successfully adopted across the enterprise. Vendors can help drive strong adoption—in number of workflows/interfaces deployed, in breadth (percentage of an organization's hospitals that adopt the solution), and in depth (percentage of employees using the solution). The report includes detailed bottom-line analysis for each vendor showing how and where each solution is deployed.

Axual raises \$20m Series B for its blockchain and digital wallet solution for healthcare professional identity and credentials validation

Summary axual

Built with leading healthcare systems, Axual is a workforce intelligence company built on top of a national real-time practitioner data network. It enables healthcare systems, staffing firms, telehealth, and health plans to reduce onboarding and enrollment time while also providing data insights for network planning, analytics, and reporting.

Headquarters: Cleveland, Ohio

Date founded: December 2018

Funding: \$33.4m total

Seed: \$3m September 2019

Series A: \$10.4m July 2021

Series B: \$20m June 2023

Healthcare investors: Intermountain, University Hospitals, Hartford HealthCare

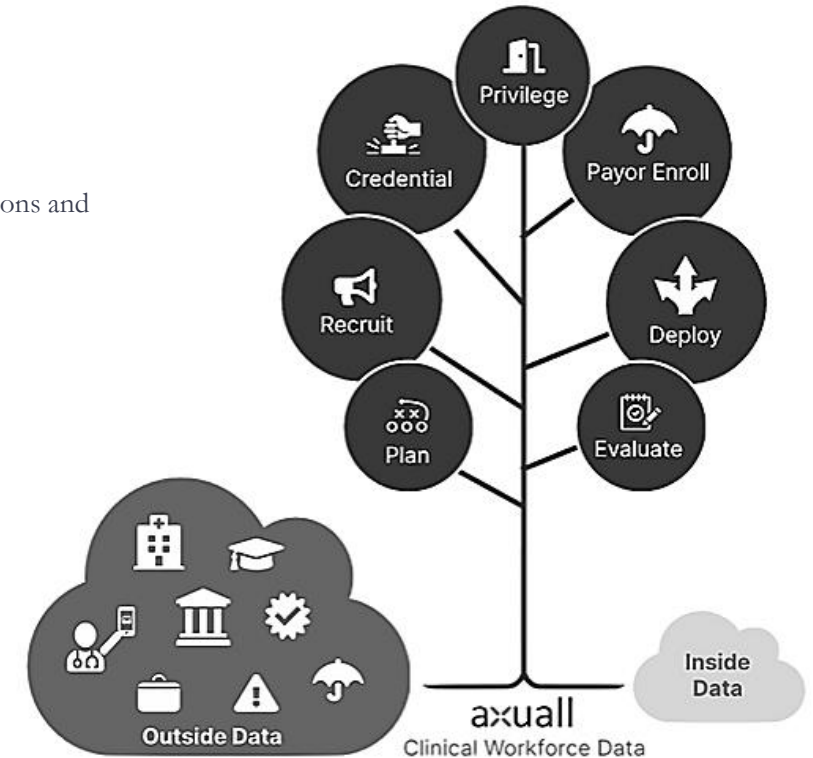
Partners: Lehigh Valley Health Network; NOMS Healthcare; MetroHealth, AristaMD, MedStar, Hyr Medical

Leadership: C-suite experience at IBM Explorys, Watson Health, Optum Vivify, Phreesia, Emmi

How it works

Axual provides a comprehensive approach to workforce intelligence, including a platform of integrated components for driving better decisions and onboarding providers quickly.

Axual does not replace your credentialing and provider management platform. Instead, it's designed to connect your existing systems to thousands of provider data sources in real-time, through its modules or by powering a host of business applications, including capacity planning, clinician network design, credentialing, privileging, and payor enrollment.



Editorial: Axual is a modern architecture platform focused on physician and nursing professional identity and credentials. Last month we highlighted Lavita AI, another venture-backed platform focusing on patient data and research interests. The core ideas behind these kind of platforms is to leverage the network effects of participants who also add their own value to the platform. Surescripts e-prescribing services are an early industry example. Vince Kuraitis, CEO at [Better Health Technologies](#), is an analyst and author, and a compelling presenter of the benefits and challenges of these kind of healthcare platforms. The experienced leadership at Axual, combined with its modern platform architecture makes it a company to watch.

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Healthcare **Analytics**

Population health management (PHM) solutions vary in breadth and complexity to support value-based care

Who are the most well-rounded leaders in PHM today? Of the 12 vendors measured in this report, Epic and Innovaccer stand out in terms of customer experience, market energy, and breadth of PHM capabilities.

Who delivers the X-factor in customer success?: Azara healthcare fosters strong partnership with hands-on approach to product optimization.

Who is seeing the most market energy and why?: Innovaccer, Arcadia, and Epic continue to be most often considered. All three are prioritizing data acquisition and data analysis and have consistently developed broad capabilities in these two areas.

Who is facilitating value-based contract revenue for customers?: For Arcadia, Innovaccer, and Lightbeam respondents, sizeable portion of revenue is tied to value-based contracts.

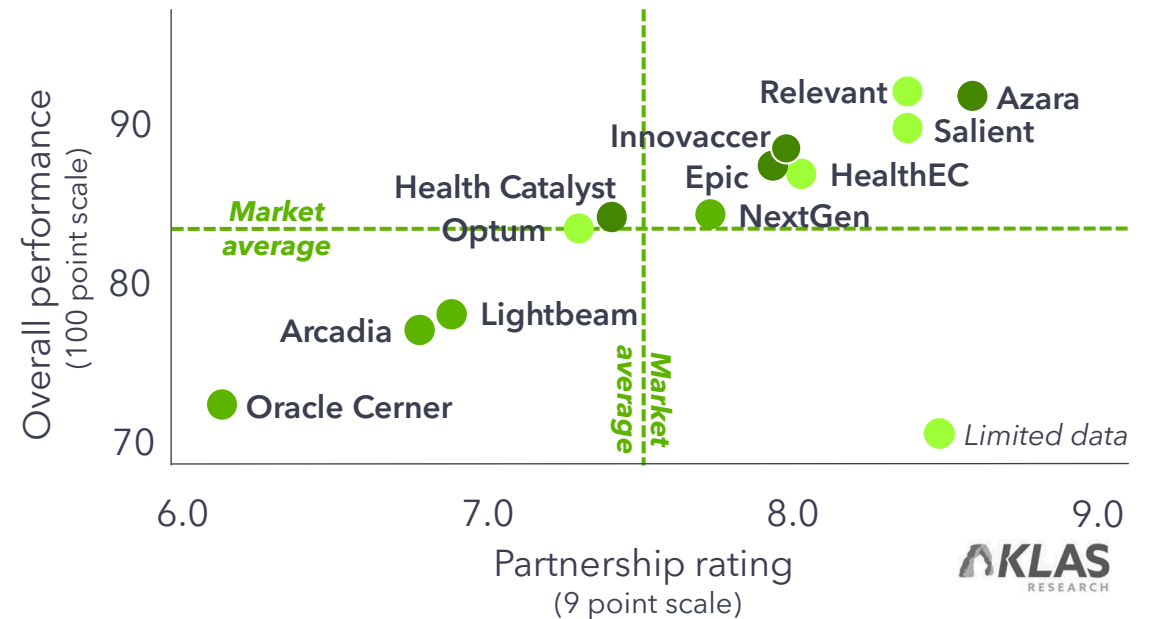
Arcadia and Innovaccer often work with customers to pull in large complex data sets and facilitate comprehensive analyses, and Innovaccer respondents in particular say the vendor's help with establishing connections empowers their PHM program.

Lightbeam customers say the analytics tool (Cohort Builder) helps them better assess and track ROI for value-based contracts by segmenting patients into custom, concentrated groups to automate workflows.

Of the PHM pillars, data acquisition is top reason for consideration.

Editorial: KLAS Research reports on the provider population health management market and finds that as more healthcare organizations start to leverage PHM technology in their journey toward offering value-based care, they are sometimes uncertain about how well vendors can fulfill their unique needs, as PHM programs vary in breadth and complexity. Notable solutions include Azara, Innovaccer, and Epic. Vendors tied to VBC contracts include Arcadia, Innovaccer, and Lightbeam. KLAS finds that data acquisition, one of five PHM pillars, is the top reason for consideration with 75% citing it. Other pillars include data analysis, reporting, care management, and clinician engagement.

Vendor performance and partnership



Four steps to successful value-based payment

Step 1: Identify potentially avoidable spending

The first step in designing a successful value-based payment program is to identify specific types of healthcare services or spending that could be reduced without harming patients. This involves analyzing data and identifying areas of waste, such as unnecessary hospital readmissions or overuse of medical procedures. By pinpointing these areas, healthcare providers can focus their efforts on reducing costs while maintaining or improving patient outcomes.

Step 2: Design services that will reduce the avoidable spending

The second step is for healthcare providers to design a different approach to delivering services to their patients that they believe will reduce the specific types of avoidable spending identified in Step 1. This may involve developing new care delivery models, implementing technologies, or providing additional support to patients. It's important to note that reducing avoidable spending often requires delivering new or different services to patients, rather than simply reducing the number of services provided.

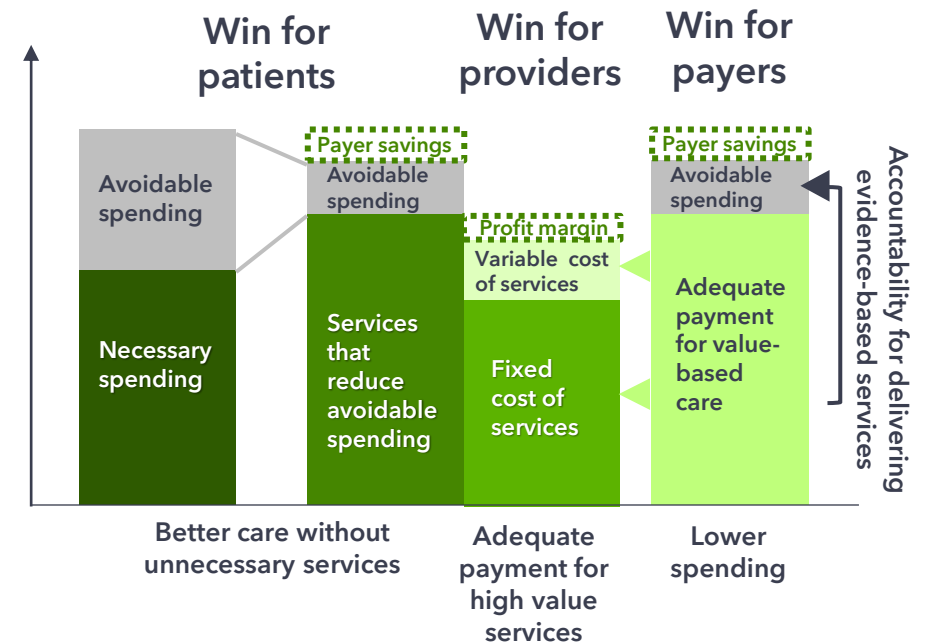
Step 3: Create payments that support the new services

The third step is to create payment models that give healthcare providers the ability to implement and sustain the new approach to service delivery designed in Step 2. This may involve developing payment models that incentivize high-value care, such as bundled payments or pay-for-performance models. It also requires negotiating reimbursement rates that reflect the value of the new services being delivered. By aligning payment models with the new approach to care delivery, providers are better equipped to deliver high-value services to their patients.

Step 4: Hold Providers Accountable for Evidence-Based Care

The fourth and final step is for providers to take accountability for delivering appropriate, evidence-based services in return for the value-based payments. If the payments created in Step 3 are sufficient to support the delivery of the services defined in Step 2, providers are expected to deliver care in a way that reduces avoidable spending. This requires providers to adhere to evidence-based guidelines and deliver services that are proven to be effective. By holding providers accountable, value-based payment programs can ensure that high-value care is consistently delivered to patients.

Value-based payment can be a win-win-win for patients, providers, and payers



Editorial: In this white paper from the Center for Healthcare Quality and Payment Reform, researchers found that the reason current VBC programs have failed is that payers have tried to create incentives for providers to reduce spending without providing the resources and flexibility to improve the way they deliver services to their patients. The solution is not to increase the financial risk for providers, but to take a fundamentally different approach. Value-based payments must be designed to ensure that providers are able to deliver high-value services to their patients. Authors lay out the solution in four logical steps where everyone wins, using the model above with detailed examples in each step.

The Center for Connected Medicine (CCM) looks at the state of the market for AI

Health/disease management and prediction

Across organization sizes, health/disease management and prediction is the top use case for which organizations are currently leveraging AI capabilities, and it is also a top area for future investment. Disease management and prediction enables identification of at-risk patients within a given population and also enables early detection of diseases such as sepsis—one of the most common use cases for AI. Such information is often used as a foundation for organizations' population health management (PHM) and value-based care (VBC) initiatives. Other use cases include preventing readmission in post-acute care patients, identifying patients who could most benefit from care management, and targeting patients most at risk for cancer or heart disease.

Operational optimization

Operational optimization is the second most common use case and the number-one area for future investment. One-third of organizations not currently using AI for operational optimization are considering future investment, and most current users are planning deeper adoption. While operational optimization does not have direct clinical or patient-facing applications, it is one of the most pragmatic AI use cases, and the high interest is no surprise given the cost pressures and thinning margins many health care organizations face.

Imaging

Imaging is the third most common use case. Imaging AI solutions and models require FDA clearance and must prove a high level of accuracy. The technology can improve radiologist efficiency by identifying the images most likely to have problems or abnormalities, allowing specialists to focus on the most urgent cases. Given the staffing shortages that many organizations face, such technology could help organizations do more with less.



Current and future AI use cases

Current use cases (n=34) Invest within two yrs. (n=49)

| | Current use cases (n=34) | Invest within two yrs. (n=49) |
|------------------------------------|--------------------------|-------------------------------|
| Health/disease mgmt and prediction | 26 | 29 |
| Operational optimization | 20 | 30 |
| Imaging | 16 | 16 |
| Population health mgmt | 15 | 25 |
| Clinical research | 14 | 17 |
| Value-based care | 10 | 24 |
| Patient/member engagement | 7 | 20 |
| Other | 3 | 1 |
| Unsure | NA | 6 |
| No plans to invest in AI | NA | 4 |

Editorial: CCM, a collaboration between UPMC and KLAS Research, found that a majority of interviewed organizations plan to continue investing in multiple AI use cases over the next two years. Operational optimization is the most common area of focus given its potential to demonstrate a more immediate ROI. Other areas with less easily proven financial benefits will likely see less investment. Only a few organizations have no plans to invest in AI over the next two years. Some of these respondents question AI's maturity and efficacy, especially in comparison to other types of technology.

NYU shows its language models are all-purpose prediction engines

Summary of the research

Physicians make critical time-constrained decisions every day. Clinical predictive models can help physicians and administrators make decisions by forecasting clinical and operational events.

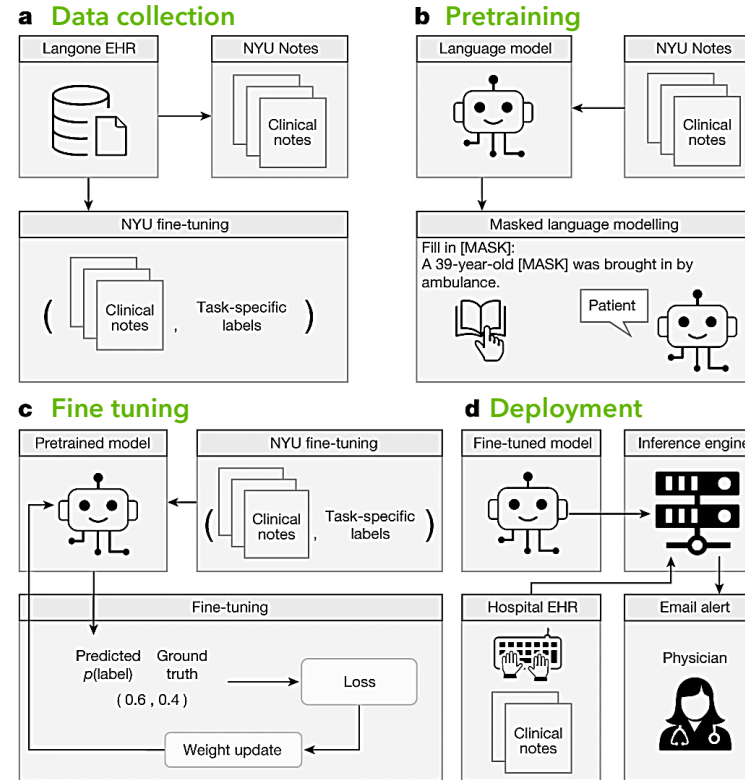
Existing structured data-based clinical predictive models have limited use in everyday practice owing to complexity in data processing, as well as model development and deployment.

Researchers show that unstructured clinical notes from the EHR can enable the training of clinical language models, which can be used as all-purpose clinical predictive engines with low-resistance development and deployment.

The research shows success on five tasks:

1. 30-day all-cause readmission prediction
2. In-hospital mortality prediction
3. Comorbidity index prediction
4. Length of stay prediction
5. Insurance denial prediction.

How NYU Langone built its language model



a, We queried the NYU Langone EHR for two types of datasets. The pretraining dataset, NYU Notes, contains 10 years of inpatient clinical notes (387,144 patients, 4.1 billion words). There are five fine-tuning datasets. Each contains 1–10 years of inpatient clinical notes (55,791–413,845 patients, 51–87 million words) with task-specific labels (2–4 classes).

b, We pretrained a 109 million-parameter BERT-like LLM, termed NYUTron, on the entire EHR using an MLM task to create a pretrained model for medical language contained within the EHR.

c, We subsequently fine-tuned the pretrained model on specific tasks (for example, 30-day all-cause readmission prediction) and validated it on held-out retrospective data.

d, Lastly, the fine-tuned model was compressed into an accelerated format and loaded into an inference engine, which interfaces with the NYU Langone EHR to read discharge notes when they are signed by treating physicians.

Editorial: Researchers at NYU Langone Health demonstrate in a 26-page report, including detailed notes on all model training data sets, that a health-system-scale large language model (LLM) can provide valuable clinical predictions from using training datasets comprised of only clinician unstructured notes. The model predicts readmission, in-hospital mortality, comorbidity, LOS, and claims denials. Researchers also claim its “low resistance development and deployment” are key benefits. Note the research was first submitted in October 2022, just ahead of the current ChatGPT tsunami.

MIT and Tufts built a new model that offers a way to speed up drug discovery

Researchers at MIT and Tufts University have devised an alternative computational approach to drug discovery based on a type of AI large language models. These models, e.g., ChatGPT, can analyze huge amounts of text and figure out which words (or, in this case, amino acids) are most likely to appear together.

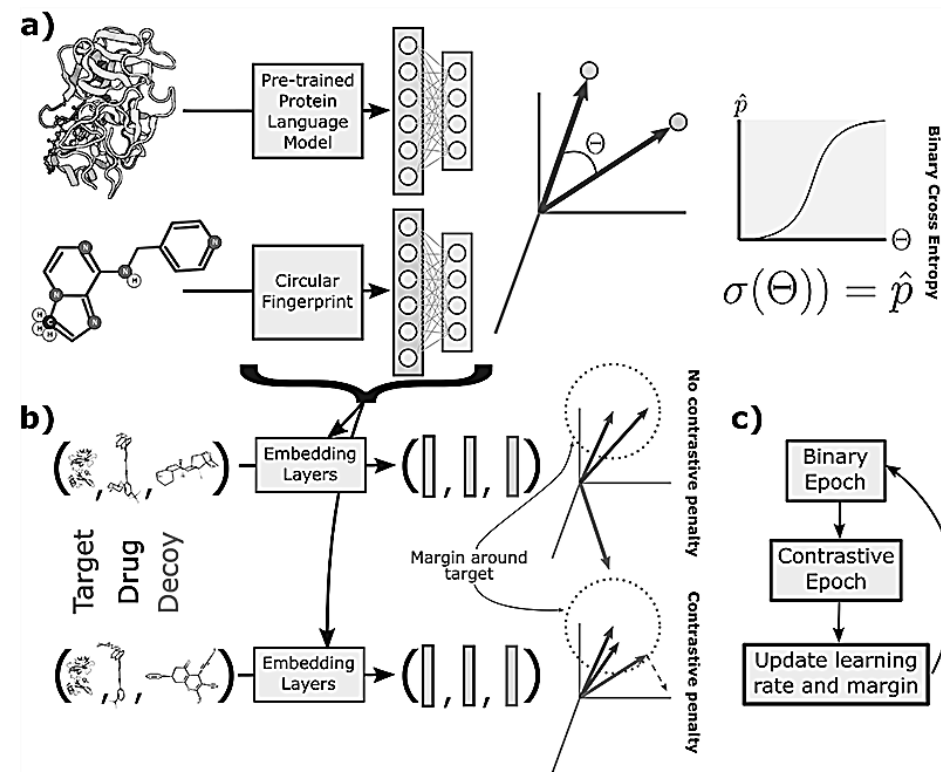
The new model, known as ConPLex, can match target proteins with potential drug molecules without having to perform the computationally intensive step of calculating the molecules' structures. Using this method, the researchers can screen more than 100 million compounds in a single day - much more than any existing model.

The MIT team approached the problem based on a protein model they first developed in 2019. Working with a database of more than 20,000 proteins, the language model encodes this information into meaningful numerical representations of each amino-acid sequence that capture associations between sequence and structure.

In their new study, the researchers applied the protein model to the task of figuring out which protein sequences will interact with specific drug molecules, both of which have numerical representations that are transformed into a common, shared space by a neural network. They trained the network on known protein-drug interactions, which allowed it to learn to associate specific features of the proteins with drug-binding ability, without having to calculate the 3D structure of any of the molecules.

To make their model less likely to be fooled by decoy drug molecules, the researchers also incorporated a training stage based on the concept of contrastive learning. Under this approach, the researchers give the model examples of "real" drugs and imposters and teach it to distinguish between them.

Architecture of the ConPLex amino acid LLM



Editorial: Here are excerpts from the description of the model architecture diagram above: ConPLex is trained in two phases, to optimize both generalizability and specificity. **(a)** Protein features are generated using a pre-trained protein language model, and drug features are generated using the Morgan fingerprint. These features are transformed into a shared latent space by a learned non-linear projection. **(b)** In the contrastive phase, triplets of a target, drug, and decoy are transformed in the same way into the shared space. **(c)** ConPLex is trained in alternating epochs of the binary and contrastive phase to simultaneously optimize both objectives.

Analysis of AI patents in healthcare shows China leading and radiology the most popular domain

10,967 patents filed between January 2012 and July 2022

Top twenty patent domains

| | | | |
|----|----------------------|----|---------------------|
| 1 | Radiology (1160) | 11 | Psychiatry (94) |
| 2 | Oncology (532) | 12 | Pathology (87) |
| 3 | Ophthalmology (454) | 13 | Gastro. (84) |
| 4 | Surgery (309) | 14 | Neurology (77) |
| 5 | Pulmonology (261) | 15 | Anesthesiology (72) |
| 6 | Cardiology (252) | 16 | Dentistry (41) |
| 7 | OBGYN (217) | 17 | Gerontology (37) |
| 8 | Internal Med. (174) | 18 | Primary care (28) |
| 9 | Emergency Med. (157) | 19 | Urology (28) |
| 10 | Dermatology (112) | 20 | Pediatrics (18) |

Top ten countries where patents filed

| | | | |
|---|---------------|----|-----------------|
| 1 | China | 6 | The Netherlands |
| 2 | United States | 7 | Canada |
| 3 | South Korea | 8 | India |
| 4 | Germany | 9 | United Kingdom |
| 5 | Japan | 10 | France |

Top twenty patent applicants (2012-2022)

| | | |
|---|-----|---------|
| Ping An Tech. (Shenzhen) | 305 | China |
| Siemens Healthcare | 219 | Germany |
| IBM | 217 | US |
| Philips | 110 | Neth. |
| Ping An Medical and Healthcare Mgmt. | 105 | China |
| Ping An Int'l Smart City Tech. | 103 | China |
| Tencent Technology Shenzhen | 90 | China |
| U. of Electronic Science and Tech. of China | 82 | China |
| Zhejiang University | 79 | China |
| Shandong University | 59 | China |
| Beijing University of Technology | 57 | China |
| Tsinghua University | 57 | China |
| Fudan University | 50 | China |
| Canon Medical Systems | 47 | Japan |
| Beijing Baidu Netcom Science Tech. | 46 | China |
| Tianjin University | 45 | China |
| GE Precision Healthcare LLC | 45 | US |
| Huazhong U. of Science and Tech. | 45 | China |
| Beihang University | 44 | China |
| General Electric | 44 | US |

Editorial: Berci Mesko (The Medical Futurist) and a team of international researchers collected 7332 patents (66.9%) from the China National Intellectual Property Administration, 191 (1.7%) from the European Patent Office, 163 (1.5%) from the Japan Patent Office, 513 (4.7%) from the Korean Intellectual Property Office, and 2768 (25.2%) from the United States Patent and Trademark Office. The number of published patents showed a yearly doubling from 2015 until 2021.

Innovations in clinical AI include support for diagnostics for breast cancer, Alzheimer's, heart failure, cardiac disease, small lesions, and gingivitis



Breast cancer

South Korean medical AI company Lunit is helping raise Sweden's cancer screening capability by partnering with one of the country's biggest private healthcare providers, Capio S:t Görän Hospital.

SCREENPOINT

Breast cancer

Combining AI-powered image analysis with image-based risk scoring has demonstrated the ability to predict long-term breast cancer risk, according to a new study from the Mayo Clinic and the University of California, San Francisco.



Alzheimer's

An int'l research team led by the Hong Kong University of Science and Technology developed an AI-based model that uses genetic information to predict an individual's risk of developing Alzheimer's disease well before symptoms occur



Heart failure

Five subtypes of heart failure that could potentially be used to predict future risk for individual patients have been identified in a new study led by UCL researchers. Current classification of heart failure doesn't predict how the disease is likely to progress.



Super bug antibiotic

Scientists at McMaster U. have used AI to narrow down thousands of potential chemicals to a handful to discover a new antibiotic, abaucin, that can potentially kill a deadly species of superbug,



Small lesions

GE HealthCare receives FDA 510(k) for deep learning software. The company's Precision DL speeds up screening time, enhances the image quality of PET/CT scans and improves small lesion detection.



Gingivitis

An int'l study led by the dentistry faculty at the University of Hong Kong has developed and tested a new AI model for screening for gum inflammation, from images inside the mouth, with 90% accuracy

SENSYDIA

Non-invasive cardiac

Sensydia, non-invasive cardiac diagnostics, raised \$3m NIH grant, designed to enable earlier detection and therapy guidance for patients with heart failure and pulmonary hypertension.

Editorial: Additional innovations in clinical AI include: Sensydia [gets](#) a \$3m grant in cardiac diagnostics; Owlter [gets](#) FDA clearance for its pulse oximetry in baby socks; Mount Sinai [developed](#) a large language model for ECG reporting that improves diagnostic accuracy.

Generative AI reconstructs video from brain activity

Researchers from the Nat'l U. of Singapore and The Chinese U. of Hong Kong used fMRI data and the text-to-image AI model, Stable Diffusion, to create a model called MinD-Video that generates video from the brain readings.

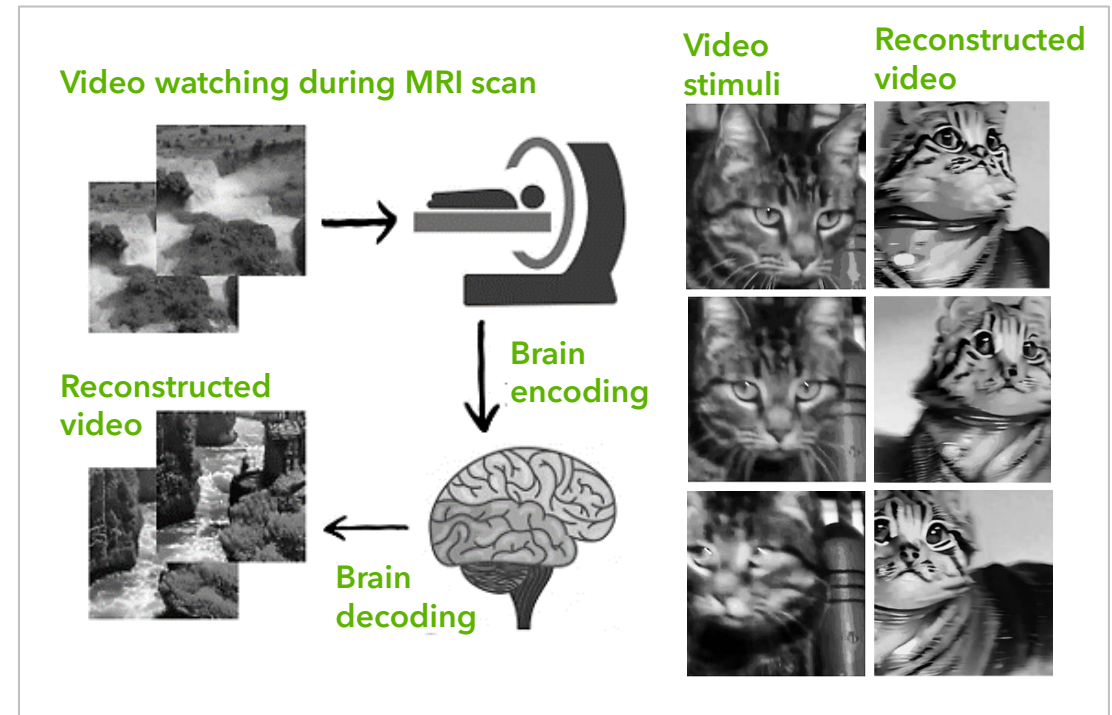
Their demonstration on the paper's corresponding website shows a parallel between videos that were shown to subjects and the AI-generated videos created based on their brain activity. The differences between the two videos are slight and for the most part, contain similar subjects and color palettes.

MinD-Video is defined by the researchers as a "two-module pipeline designed to bridge the gap between image and video brain decoding." To train the system, the researchers used a publicly available dataset containing videos and fMRI brain readings from test subjects who watched them. The "two-module pipeline" comprised a trained fMRI encoder and a fine-tuned version of Stable Diffusion, a widely-used image generation AI model.

85% accuracy. Videos published by the researchers show the original video of horses in a field and then a reconstructed video of a more vibrantly colored version of the horses. In another video, a car drives down a wooded area and the reconstructed video displays a first-person-POV of someone traveling down a winding road. The researchers found that the reconstructed videos were "high-quality," as defined by motions and scene dynamics. They also reported that the videos had an accuracy of 85 percent, an improvement on previous approaches.

MOTHERBOARD
TECH BY VICE

Brain decoding & video reconstruction



Editorial: Here's an example of some early research from Singapore and Hong Kong showing that fMRI scans of the brain taken during video watching can deconstruct the signal and with a version of a large language model for video, reconstruct a high quality video with considerable accuracy. Researchers cite three key impacts: (1) the dominance of the visual cortex as a major component of visual perception; (2) the fMRI encoder operates in a hierarchical fashion, which begins with structural information and then shifts to more abstract and visual features on deeper layers; (3) the fMRI encoder evolved through each learning stage, showing its ability to take on more nuanced information as it continues its training. The idea of fMRI "mind reading" will also likely evoke public pressure for adequate controls.

Transactions in analytics segments include value-based care, clinical research, rev cycle, and drug diversion



Value-based primary care

\$260m Series F

Aledade works with 1,500 independent primary care practices to facilitate value-based care via 150 contracts, 45 states, 2m patients, \$20b in spending (\$678m total raised), \$450m revenue, \$2.1b valuation



Value-based care analytics

Merger

Apixio, AI solutions for value-based care for payers and provider groups merges with ClaimLogiq, reduces claim errors prior to payment, both backed by New Mountain Capital



Drug discovery AI

\$70m Series D

BenchSci (Toronto), AI and machine learning (ASCEND platform) for preclinical research (\$170m total raised), used by 16 of the top 20 pharma, 50k scientists at 4,500 research centers; 400 employees



Imaging data research analytics

\$54m Series D

Flywheel, medical imaging data management, curation and analysis (\$106m total raised), provides analysis-ready datasets for accelerated research and AI development; Roche and UCSF partners



Clinical data abstracting

\$25m Series B+

Carta Healthcare provides clinical data collection, analysis, and insights from registry data for health systems (\$43.3m total raised); Memorial Hermann and UnityPoint investing in this expanded round



Value-based contracts for FQHCs

\$20.2m Series A

Yuvo helps federally-qualified health centers transition to value-based care contracts by assuming the risk on behalf of the providers and easing the administrative burden of operations and infrastructure



Revenue cycle analytics

\$16m seed round

Outbound AI is a conversational AI tool for healthcare with 24/7 virtual agents that focus on the revenue cycle, including eligibility and benefits verification, claims status and prior authorization



Clinical trial data management

\$14m Series B

Developed with its partner, Pfizer, Beaconcure provides Verify, a SaaS system using ML/NLP for clinical trials output data management (\$16m total raised); shortens time to submission, reduces error-rates and costs

Editorial: Additional transactions included Wolters Kluwer [acquires](#) Invistics for drug diversion monitoring; BurstIQ [acquires](#) business intelligence platform from Olive AI; Syntax Health, value-based care analytics built at Redesign Health, [gets](#) \$7.5m seed funding; Braintale (France) [gets](#) \$5m seed funding for its brain white matter analytics; Gradient Health [gets](#) \$2.75m seed funding for its curated radiology images showing pathologies; AccurKardia [gets](#) \$2.7m seed funding for its clinical grade ECG interpretation software; starting with electrocardiogram algorithms used in healthcare settings, Dandelion Health [pilots](#) a free service to measure the performance and bias of AI across key racial, ethnic and geographic subgroups.

A large, flowing graphic composed of many thin, overlapping blue lines that create a sense of movement and depth, resembling a wave or a digital signal. It spans across the middle of the slide.

Consumer Health and Technology

Fundraises and product launches in food and nutrition segments



Digital nutrition coaching platform secures \$15m Series A

Mend combines nutritional supplements with an AI-driven digital platform to help manage chronic conditions

A care team is accessible through the app which aids peri-operative recovery with personalized risk factors taken into consideration

In 2022, Mend launched a line of nutraceutical products which integrated with the Mend digital behavioral health coaching platform, Upgraid

\$29.6 million raised to date



FarmboxRx launches program to fight food insecurity

Food delivery company FarmboxRx announced the launch of Feed by FarmboxRx, an app-based program to supply individuals affected by cuts to SNAP benefits with produce and pantry staples

The program will allow six boxes of produce to be delivered to select individuals each month, along with educational magazines for food preparation recommendations

Applicants must verify their reliance on SNAP/EBT benefits and live in US states where those benefits have decreased



Personalized nutrition startup launches with \$10.25m Seed

AHARA (Sanskrit for referring to nourishment) leverages multiple data inputs, as well as genetic, epigenetic and biomarker testing, which it then combines using an AI-enabled algorithm

The output identifies an individual's key nutrients and provides ultra-personalized nutrition recommendations

Platform's methodology is supported by over 300 scientific studies and an advisory board comprised of doctors, clinicians, and nutrition professionals

Uber Health

Uber Health adds grocery, over-the-counter item delivery

Facilitated by Uber Eats, providers and payers can have groceries and over-the-counter items delivered directly to a patient's home

Touts the offering as simplifying the entire patient journey, from getting patients to medical appointments to accessing groceries

In April, the company announced it was adding same-day prescription delivery services to its platform via an integration with ScriptDrop; Last year, it partnered with Walgreens and DoorDash to deliver Paxlovid, an oral antiviral therapy for Covid



Corporate food health benefits provider raises \$4m Seed

Bitewell is a healthy food marketplace that works directly with employers to provide food health benefits, reducing insurance premiums and improving health for users

Its FoodHealth Score is incorporated into its massive food marketplace, which helps users navigate food shopping with customized health goals in mind

Food purchases help users understand if their diet is net-accretive or net-dilutive to their health

Editorial: In addition to FarmboxRx and Uber Health, another company offering grocery delivery service to providers and patients is Instacart Health, the health division of grocery delivery service Instacart. In April, it added three new tools allowing providers to create a curated shop for their patients with food recommendations, healthy recipes, and medically-tailored grocery lists. Other nutrition-focused companies include Noom, Wellory, Second Nature, and Found. Viome and Day Two incorporate microbiome testing to provide custom meal plans. Season offers food as medicine, tailoring meals to deliver better health outcomes. NutriSense and India's HealthifyMe pair continuous glucose monitoring devices with coaching.

Headlines at the intersection of sleep tracking and wearables

OURA

Oura will now share its sleep scores with CGM providers

Oura, makers of a ring that tracks peoples' biometrics, announced new partnerships to share its user-generated data with three providers of continuous glucose monitors (CGMs)

January, Supersapiens, and Veri will now receive sleep scores and other biometric data from Oura so they can see how these measurements affect users' glucose levels and overall health

Oura pursued these partnerships because glucose monitoring is a key piece of the overall picture of a person's health

Integrations could lead to more insights about the relationship between sleep quality and glucose levels

ULTRAHUMAN

Ultrahuman's new Ring Air can adjust sleep patterns

Ultrahuman has unveiled the Ultrahuman Ring Air, the follow-up to its first-gen smart ring

The ring boasts a Sleep Index feature that tracks the usual array of factors such as sleep duration, resting heart rate, and sleep quality

To provide better sleep outcomes, the new Circadian Phase Alignment feature will also suggest adjustments in user habits for sunlight exposure and activity levels to maximize sleep efficiency

It will also measure health indicators such as sleep patterns, movement, heart rate, and skin temperature

LUMOS

LumosTech provides circadian rhythm misalignment relief

The startup's sleep mask addresses the circadian clock disruption faced by night shift workers and jetlagged travelers

There are two parts to the Lumos light therapy: light pulse and sunrise effect

Light pulses are predominantly used to shift the body's internal clock to help those whose sleep is affected by drastic changes to their schedules and is effective in rapidly recalibrating the circadian rhythm

Sunrise effect gently exposes users to a simulation of sunrise in the morning, stabilizing their circadian rhythm to help them wake refreshed

Editorial: The sleep tracking space is crowded, with most of the big wearable companies offering sleep tracking on their fitness trackers, but where segment-specific devices can offer a more robust feature set. Oura and Ultrahuman are direct competitors. Both make smart rings that monitor sleep, movement, recovery, and other parameters. Movano Health is working on smart ring designed for women that tracks menstrual cycle and mood tracking related to menopause.

Patients and providers both report that access to care has become more challenging in the past two years

Despite increased adoption, patients and providers see the digital front door as still being a less-than-ideal entry point into healthcare, according to a report from Experian Health.

Almost half of healthcare providers and a fifth of patients have reported that gaining access to care has actually become more challenging in the past two years.

Both patients and providers want access to be streamlined and efficient. Providers that leverage technology to reduce friction at patient intake will secure a competitive edge.

Seeing a practitioner quickly has stayed on patients' "most challenging" list for the past three years, trending up every year. Online self-scheduling gives patients the freedom to book and cancel appointments at their convenience.

Giving patients more power over their payment options is becoming increasingly vital. Accurate pre-care estimates, early payment plans, digital payment options and patient portals means patients will find it easier to pay their bills.

Providers who have implemented self-scheduling are likely to utilize another service that patients value: omnichannel communications. The 40% of providers saying they currently offer self-scheduling are heavy users of patient portals, the phone, email and text for two-way communications.

Are providers and patients on the same page?

Patients



Say they would like to schedule appointments online or via mobile device



Say they are likely to cancel or postpone care without an accurate estimate



Say they want more digital options for managing healthcare

Providers



Say digital/mobile access is very important to patients



Agree accurate, up-front estimates contribute to better collections success



Agree that it's important to their organizations to improve both the access and financial experiences of patients



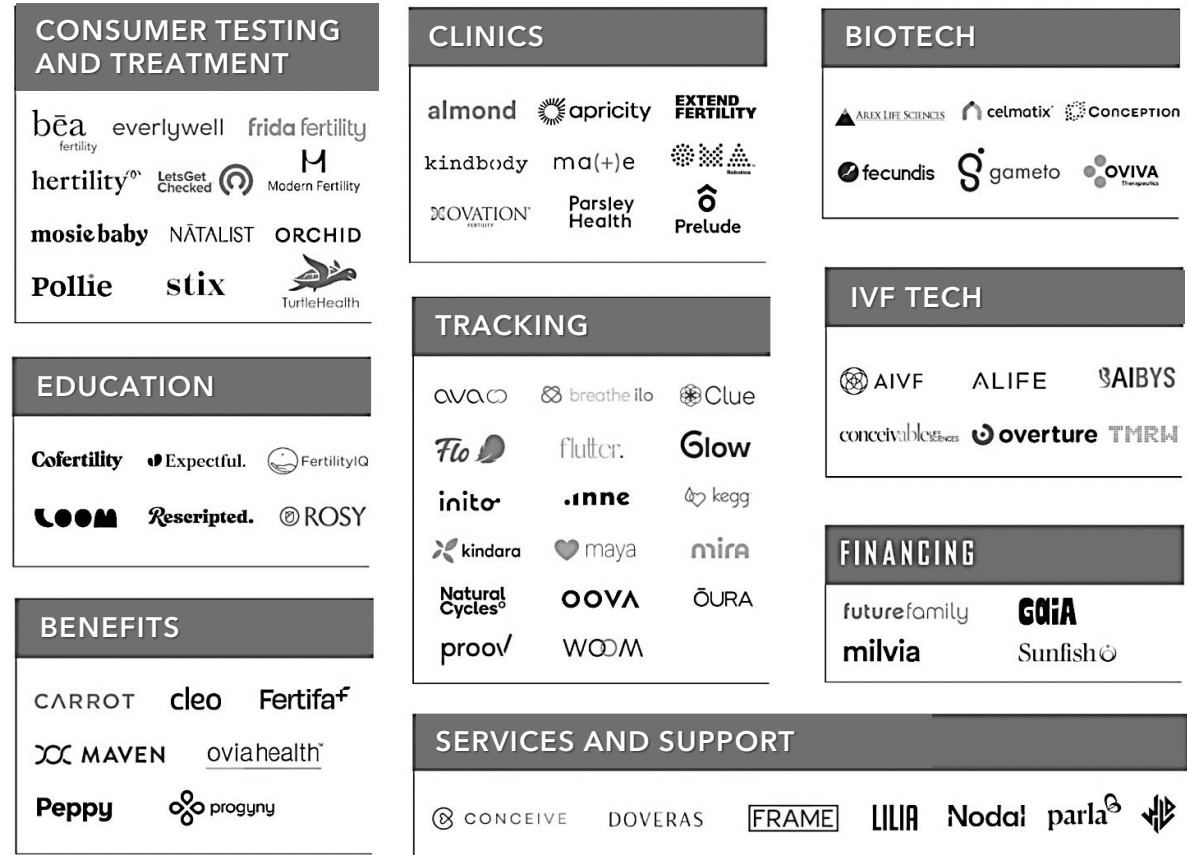
Editorial: The report includes findings from a survey in December 2022, which involved more than 1,000 patients and more than 200 healthcare providers across the US. The surveys reflect a “slowly shrinking gap between patient satisfaction and healthcare’s efforts to better address consumerism and earn patient loyalty,” the report concluded. Patients should benefit from convenience, transparency, communication and possibly reduced costs. Providers will also benefit as collections and reimbursements increase and become more predictable, and patients reward them with loyalty.

Three fertility startups raise cash, plus a robust market segmentation map

Oova raises \$10.3 million in Series A funding for its fertility tracking solution. The company offers the Oova Kit, an FDA-registered at-home urine test that measures luteinizing hormone and progesterone. Oova has a network of over 100 clinics and has trained its algorithms on data from over 10,000 cycles.

Canadian fertility care platform Twig Fertility raises \$8 million in Series A financing. Twig's platform utilizes artificial intelligence and machine learning algorithms to provide personalized solutions and support for those facing fertility challenges. Canada has the lowest per capita use of fertility treatments in the G7.

Mate Fertility closes a \$5.2 million Series A to make fertility care more accessible. Mate's mission is to make fertility treatment affordable, accessible and consistent in the US by finding fertility deserts and upskilling OB/GYN partner providers under REI supervision to practice at the top of their license by providing services such as egg retrievals and embryology services.



Editorial: Journalist turned VC Christina Farr and fertility blogger Leslie Schrock, writing on the Second Opinion blog, provide a deep dive into why the fertility market is poised to explode. "We're seeing more momentum today around innovations that we think could bring far more precision to the process, help people get diagnosed earlier, and/or bring the price down," they write. "AI is also highly promising as there are millions of people globally who have now received treatment." Also this month, a startup named Zuri Fertility launched. Its platform provides resources for patients who are trying to conceive – including telehealth, at-home testing, prescriptions, mental health services, education and care coordination. The site's registration fee is \$2,000 and the subscription fee is about \$500 per month.

Older Americans increased their use of patient portals during the pandemic

According to the University of Michigan Institute for Healthcare Policy and Innovation, nearly eight in ten Americans between 50 and 80 years of age used at least one online portal to manage care, and nearly half of the sample (49%) used more than one. Only 51% said they used a healthcare portal in the 2018 poll.

Large numbers of older Americans find using and navigating portals confusing. One in four said they would benefit from training in how to use the existing crop of healthcare portals, many of which are outdated.

Older adults with annual household incomes below \$60,000, and those who are Black or Hispanic, have lower rates of portal use. They were also less likely to say they're comfortable using a portal than respondents who are higher-income or non-Hispanic white.

Many older patients still prefer phone calls for some tasks like scheduling appointments or asking a medical question. Portal users in general said they prefer the portal to the phone when it comes to tasks such as getting test results and requesting refills of their prescriptions.

While more older Americans are embracing technology, nearly 22 million seniors still do not have wireline broadband access at home, limiting their access to essential digital health care services like patient portals.

Key takeaways and trends

| | |
|---|-----|
| Percentage of adults aged 50-80 who reported using a patient portal | 78% |
| <i>Percentage of above who said they had used one within the last six months</i> | 85% |
| Percentage of portal users who felt very confident navigating a portal | 57% |
| Percentage of portal users who authorized access to someone else | 49% |
| Percentage of portal users who would find training on portal usage and features helpful | 24% |



Editorial: The jump in portal use between polls done in 2018 and 2023 likely happened in part due to the increase in use of telehealth visits. "This change makes access to secure portals even more important for older adults who want to see their doctors and other healthcare providers virtually. It also makes the disparities we found in our poll even more troubling," says Denise Anthony, Ph.D., who chairs the Department of Health Management and Policy and studies use of telehealth and patient portals. Evidence shows that patients who use portals to access their information are more likely to take an active role in their care and stick to the treatment plan their physicians and other providers recommend.

Rock Health offers three Medicaid innovation areas for digital health startups

Extending provider capacity

Digital support tools for Medicaid providers include telemedicine platforms, RPM suites, and clinical workflow software that help providers manage the combined medical and social needs for Medicaid patients

A small but growing number of digital health startups are offering virtual or hybrid care delivery for Medicaid enrollees, often with a focus on key underserved patient communities such as women+, children, or individuals with substance use disorders

Examples:



Optimizing enrollee engagement

Startups are stepping in to help Medicaid enrollees understand and utilize the services and resources available to them; most often they combine the scaling power of technology with on-the-ground community liaisons

Some startups are choosing to focus on a discrete social challenge for Medicaid enrollees such as housing, nutrition support, or transportation access in order to deliver the biggest impact to enrollees and demonstrate the highest ROI to MCO partners

Examples:



Strategizing with data-driven insights

Startups looking to support Medicaid data analytics typically offer tools that provide MCOs with insights into the risk factors impacting their enrollees

For example, Socially Determined analyzes a wide range of data sources to help decision makers quantify social risks, such as health literacy or transportation barriers, within their communities. Socially Determined's SocialScape tool even flags enrollees most at-risk of losing coverage following the PHE

Examples:



Editorial: Rock Health sees Medicaid as one of the most promising arenas for digital health activity, despite the overall cooling of sector funding. It is a critical time for Medicaid administrative and operational support following the end of the public health emergency, which will kick off a 12-month unwinding period that is expected to bring unprecedented churn in Medicaid programs across the country. 80% of respondents with Medicaid as their primary insurance reported having used telemedicine in a recent survey, indicating that most adult Medicaid enrollees own mobile technologies, use them for a variety of health purposes, and are interested in trying new digital health applications in the future.

Elevance Health develops population health tool to measure whole-person health

The The Whole Health Index (WHI) incorporates both patient-level and population-level data from 93 measures that are representative of social, physical, and behavioral factors of health to measure whole-person health. Combines multiple data sources and measure types, including publicly available data, claims data, and process and outcome measures, at individual and area levels.

The WHI functions to triage members to the right solutions for their specific health and social needs. Examples include a campaign to improve influenza vaccination rates or programs to prevent obesity and improve medication adherence in Medicaid populations.

Most measures and risk scores in population health management rely on diagnoses captured from administrative claims, which don't differentiate health among those lacking access to health care. Other commonly used measures for comparing health across countries are based on mortality data, such as life expectancy, or disability-adjusted life years.

Elevance Health members' WHI scores ranged from 9.17 to 90.75 (out of 100). The median was 53.23.

Socially vulnerable population subgroups had lower Whole Health Index scores.

These include older adults, women, those dually eligible for Medicare and Medicaid, rural residents, and Black, Hispanic, or Native American residents

Three domains of whole person health

Global Health Domain

Disease burden during the measurement period (100%)

Clinical Quality Domain

Cardiovascular care, diabetes care, oncology, respiratory care (40%)

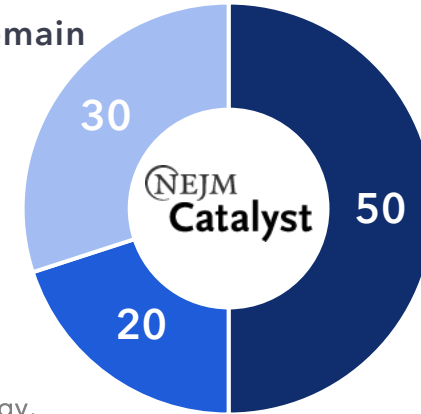
Overuse/appropriateness, patient safety (20%)

Access to care prevention/screening (10%)

Access to care utilization, care coordination (10%)

Behavioral health (10%)

Women's health (10%)



Social Drivers Domain

Financial strain (37%)
Housing instability (22%)

Affordability (18%)
Food insecurity (16%)
Transportation barriers (6%)
Neighborhood composition (1%)

Editorial: The Whole Health Index was developed by Elevance Health and is intended to serve its members but also to serve as a tool for others. Organizations that have access to administrative claims, electronic health records, or comprehensive care history, including but not limited to government entities, public health departments, health plans, provider organizations, and integrated health care systems, will be able to compute the Whole Health Index for their populations based on this methodology.

Value-based care company Aledade raises monster \$260M Series F

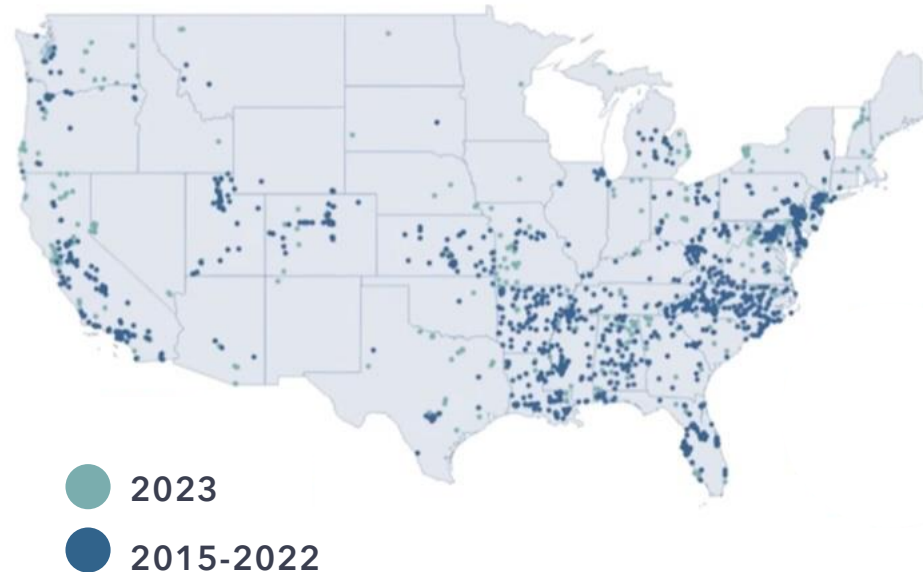
The Bethesda, Maryland-based public benefit corporation works with primary care providers to build tech-enabled accountable care organizations.

With the funds, the company will be looking to expand its provider networks and upgrade its tech. The round was led by new investor Lightspeed Venture Partners, with participation from Venrock, Avidity Partners, Omers Growth Equity and Fidelity Management & Research Company.

This is not the first time that Aledade has raised a \$100 million-plus megaround. The company raised a \$64 million Series C in 2020, followed by a \$100 million Series D in 2021. Last year, the company tacked on even more, raising \$123 million in a Series E in June, which was one of the year's largest raises.

To date, the company has raised \$678 million. It is one of the highest-valued unicorns in the sector with a value of \$3.5 billion.

Aledade boasts the largest independent primary care network in the country



NETWORK

5000+ PCPS
1500+ Practices

SCALE

2m+ lives
145+ contracts
\$20b medical spend

RESULTS

\$450m+ '22 revenue
\$135m+ '22 platform contribution

Editorial: M&A and venture activity in advanced primary care continues to chug along, and there's a particular focus on enablement/platform level plays as well as technology/analytics/infrastructure. In February, Aledade acquired AI-enabled value-based care analytics platform Curia to utilize their AI-based capabilities to expand its data gathering, provide more accurate data predictions and help enhance primary care workflows. Last year, Aledade purchased Iris Healthcare, an advanced care planning solutions platform that became part of Aledade's health services unit, called Aledade Care Solutions.

Health Recovery Solutions leads the pack in KLAS' look at RPM vendors

Customers of Health Recovery Solutions are often large orgs with enterprise-wide programs that cover multiple conditions and care settings. Customers feel the vendor is invested in their success and delivers a solid partnership. Some question their pace of innovation.

Biofourmis (limited data) customers vary in size and typically use the vendor's technology to monitor a broad range of conditions. They view the vendor as innovative and a strong partner; feedback on the solution's integration and ease of use is mixed.

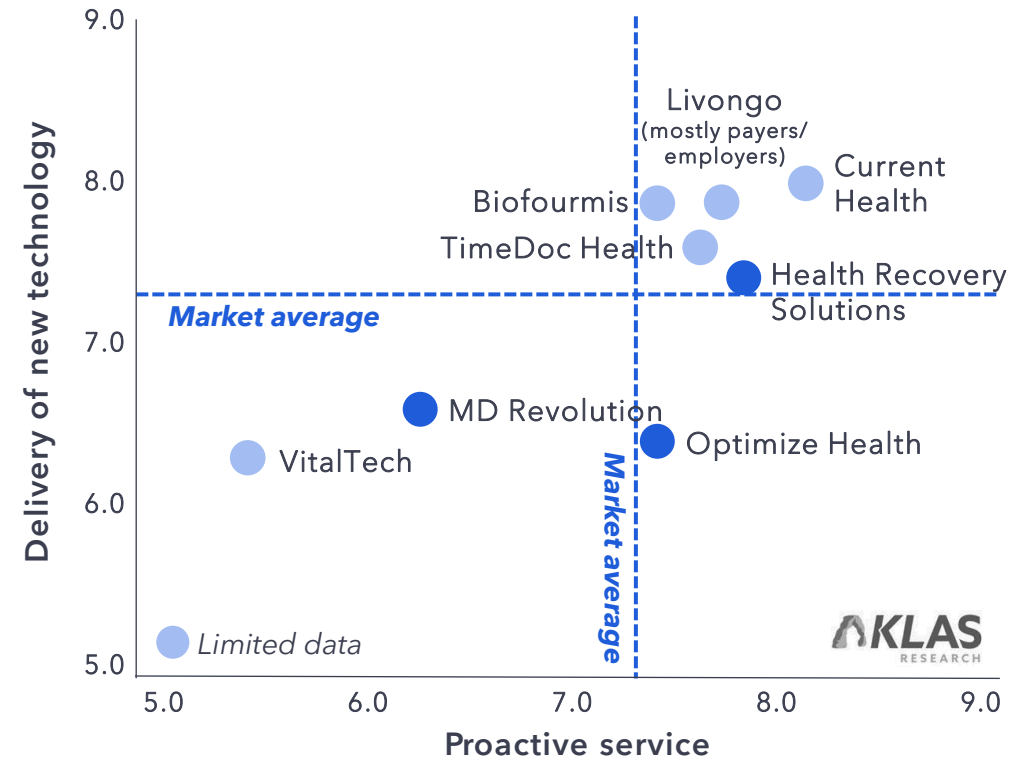
Current Health customers are mostly large orgs. Vendor is collaborative and eager to create enhancements that meet customer needs, even if that development is sometimes slow.

MD Revolution customers, most of whom are clinics using the solution to monitor hypertension and/or heart disease patients, also utilize their care management services. Satisfaction varies widely depending on the customer's experience with their account manager.

More than half of VitalTech's customers (limited data) plan to replace the solution, citing unreliable support, a lack of proactive account management, or the solution's lack of more advanced functionality.

TimeDoc Health and Optimize Health stand out for offering good ease of use, an important benefit given that RPM efforts are often targeted at Medicare patients, who may be less familiar with technology than other patient populations.

Delivery of new technology vs. proactive service



Editorial: KLAS defines RPM technology as solutions that acquire, store, or transmit patient health data, most often outside of a conventional care setting. Other featured vendors include Livongo and CareSignal, which had insufficient data to chart on the graph above. Livongo is used mostly by employer and payer organizations, who offer the chronic care management solution to employees or members. CareSignal offers deviceless RPM, in which patients provide updates on their condition via calls or text. Clinics tend to be the most satisfied with their solution given their greater need for the staff augmentation the company provides. Livongo customer relationships have historically been good, though some customers have seen a dip in service post-Teladoc acquisition.

A trio of pharma invest in consumer health segments



Bayer launches precision health business unit

The company said the new group will focus on tools that could help patients make informed choices by providing more personal health information, which could prevent or better manage disease

It will work with startups and other digital health companies as well as expand its own portfolio of digital health capabilities

Earlier this year, Bayer built an online tool for assessing cardiovascular risk factors with Huma Therapeutics

It has previously partnered with Ada Health to integrate its symptom checker into Bayer brands, and its investment arm led Ada's Series B raise announced in 2021



Sanofi strikes \$30m strategic agreement with DarioHealth

The deal will give Dario access to Sanofi's sales teams to market its existing products, and it would also integrate Sanofi's products onto its platform

Dario started with a smartphone-connected glucometer and an app to help people manage diabetes; since then, it has expanded into other conditions through a series of acquisitions, including buying devices to help people correct their posture, monitor PT exercises at home, and provide digital cognitive behavioral therapy exercises

Dario has been operating at a net loss since it started in 2011, and is working to compete with Livongo and Omada, which offer a similar suite of services, as well as shift its business from a direct-to-consumer model to more B2B sales



BI, Click Therapeutics expand partnership on digital therapeutics

Boehringer Ingelheim and Click Therapeutics will expand their partnership to develop and commercialize another prescription digital therapeutic for patients with schizophrenia

The deal will net Click up to \$460 million, plus tiered royalties; it builds on a 2020 collaboration that developed CT-155, an initial therapeutic for schizophrenia

The companies said CT-155 has met its development milestones to date, and it's generated supportive evidence in clinical learning studies

In 2019, Click made a deal with Otsuka to develop and commercialize a prescription digital therapeutic for major depressive disorder; it launched a decentralized clinical trial for it in 2021

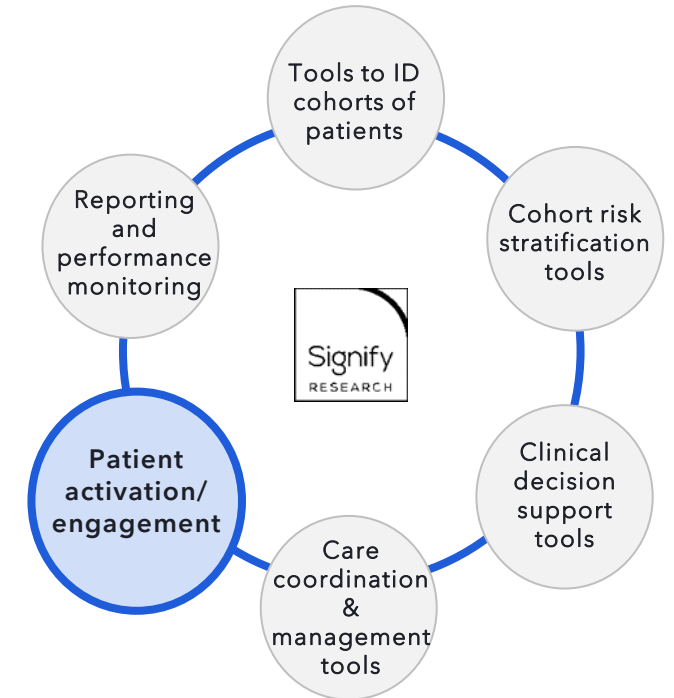
Editorial: This is likely just the beginning of a growing wave of pharma and digital health partnerships. Pharma investments in digital health last year include partnerships between Biogen and MedRhythms to develop and commercialize an investigational prescription digital therapeutic for the potential treatment of gait deficits in multiple sclerosis. Novartis and Evermed teamed on an approach that entails tailored, education-based videos aimed specifically at rheumatologists. And AstraZeneca sold its disease management platform to Huma Therapeutics and the two companies will collaborate on creating apps targeted at different therapeutic areas.

Eight key insights on improving patient engagement and its benefits to VBC

- 1 **Developing user-friendly solutions that enable patient/provider communication across multiple channels** and that feature a seamless interface is essential to create a satisfying experience for patients to improve their adherence to care plans.
- 2 VBC providers would find it beneficial if their patient engagement tool could offer **guidance on the most effective ways to connect with specific patients.**
- 3 **The emergence of Large Language Models have the potential to change the reliability of tools** such as chatbots and automated voice-based solutions by improving the quality of the software, ensuring accuracy, and offering a more ‘human touch’ experience.
- 4 **There is a demand to build more holistic solutions** that not only help identify care gaps by providing a complete view of the patient but also engage the identified patients into care management plans.

- 5 **Developing automated solutions that eliminate the need for manual operations** would alleviate the burden placed on providers and decrease care staff burnout.
- 6 **There is a lack of interoperability between platforms utilized for patient identification and care gap closure.** When systems don’t communicate with each other, it becomes harder to exchange information and to find unstructured data such as clinical notes.
- 7 **Decision-makers and buyers have emphasized that their topmost priority is to protect patient information** and that they would not consider any software unless they are most certain about data security.
- 8 **Developing IT solutions that alert providers at the point of care to address risk adjustment factor gaps with patients attending appointments** will improve the quality of care, the accuracy of treatment plans, and encourage patient engagement in decision-making.

Health insights/care coordination tools



Editorial: “Solutions with a more strategic and intelligent approach to patient activation and engagement are paramount to the success of VBC,” says Signify Research analyst Mohita Deshpande. “It is vital to create tools that improve patients’ attitudes and encourage positive behaviors towards managing self-care while also ensuring ease in accessing portals and apps that enable engagement with VBC providers. From a technical standpoint, it is essential to develop tools that offer a comprehensive patient overview, are automated, and that integrate smoothly with other care management IT systems to efficiently handle both structured and unstructured data, and most importantly, keep patient data secure.”

European dermatology startups raise funds for telehealth and DTx platforms

GETHARLEY

Based in: UK

Funding: \$52m Series B

GetHarley is a telehealth platform that gives anyone a direct channel to qualified skincare professionals, including dermatologists and plastic surgeons, who recommend products and treatments for conditions such as acne, uneven skin tone or hyperpigmentation, rosacea, melasma and more

Online consultations cost \$50 for 30 minutes, though where more complex medical histories are involved, patients can pay \$186 for a more senior-level consultant dermatologist

Part of GetHarley's business model involves selling skincare products as part of a personalized plan, catering to specific individual factors such as whether the individual has dry or oily skin, or how light / dark their skin is

100,000 active users; 70 employees

Nia

Based in: Germany

Funding: \$3.75m Venture

Nia Health, a spin-off of Charité Universitätsmedizin Berlin, offers digital solutions for the treatment and support of sufferers of chronic skin conditions

The startup's products include digital therapeutics, such as Nia (eczema), Sorea (psoriasis), and milderma (acne), plus technologies for monitoring patients and conducting clinical trials

Via machine vision, Nia Health enables accurate documentation of disease and therapy progression and thus optimized treatment

Funds will be used for expansion in German-speaking countries, as well as launching in other EU countries in the next 24 months and preparing for the US market entry

Editorial: The average wait time to see a dermatologist in the US is 32 days, providing an opening in the marketplace for a variety of startups. Unlike many of the companies in the space, neither of the above are focused on moles or suspicious skin lesions. Berlin-based Formel Skin, which offers remote access to a dermatologist and an accompanying personalized skin treatment regime, raised €30 million in December. Curology and Apostrophe both provide prescription meds for skin conditions.

Partnerships in consumer health segments



MSK care

Transcarent, a digital platform focused on the self-insured employer market, and ViewFi, a tech-enabled virtual orthopedic and rehabilitation platform, are partnering to deliver virtual orthopedic and musculoskeletal care to patients through Transcarent's Consult Solution.



At-home testing

California-based diagnostics startup Simple HealthKit announced that it is partnering with Walmart to make its home diagnostic test kits for diabetes, sexual wellness, and respiratory health available to customers via the retail chain's website.



Surgical and cancer care

Partnership integrates Carrum Health's value-based program for employers into the partner network of apree health (merger of Caslight and Vera), allowing employers to provide their employees access to surgical and cancer care from the top 10% of docs and providers.



In-home care

Via the partnership, Georgia-based health system Emory Healthcare patients can request DispatchHealth's care for a wide range of acute medical services including injuries and illnesses, viral infections, COPD exacerbations, congestive heart failure, urinary infections and more.



Eating disorders

Accolade added Equip as a trusted partner, a vendor vetted by Accolade. Equip virtually connects patients struggling with an eating disorder with a five-person care team, which includes a medical physician, dietician, therapist, peer mentor and family mentor.



Cancer research

Walgreens will combine its national footprint, patient insights, recruitment technology, and infrastructure to engage diverse patient populations in Freenome's research program, which aims to evaluate blood-based early detection tests for multiple cancers.



LGBTQ+ care

Pear Suite, platform for community health workers, partnered with OutCare Health, a nonprofit focused on LGBTQ+ health equity, to provide Pear's platform to employers, healthcare orgs, and health plans to address the care needs of the LGBTQ+ community



Maternal mortality

The collaboration is designed to improve maternal mortality by giving users of Emagine's pregnancy app access to blood pressure monitoring tools, including Withings' smart scale, connected blood pressure monitor, and wellness coach meetings.

Editorial: Additional partnerships this month include Hackensack Meridian Health [partnering](#) with AI-driven speech analysis start-up Canary Health on digital biomarkers; HeartBeam [entered](#) into a strategic alliance agreement with Samsung, extending the existing agreement between Samsung and LIVMOR, which HeartBeam acquired the assets of earlier this year; Virgin Pulse and Headspace [expand](#) their relationship to make it easier for employers and health plans to provide mental health resources.

Rapid growth predicted for hospital at home market

According to a new report from Chilmark Research, Hospital at Home (HaH) programs will continue to grow in adoption in the coming years. Many providers are still concerned about patients' safety and better HaH market clarity, but it's only a matter of time. Those who haven't implemented HaH yet will have to race to do so.

At the time of healthcare consumerization, hospital at home becomes a highly valuable service in order to attract, retain, and provide best care for patients. HaH capability stretch far beyond acute care in CMS definition and soon enough can become the best care setting for hospice, post-natal, rehab, end-of-life, and many more.

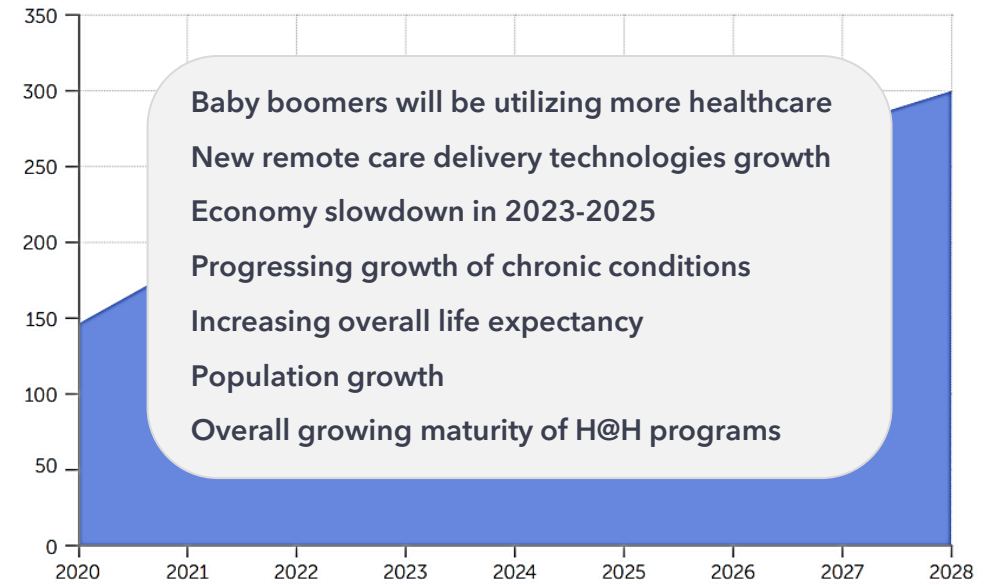
Hospital at Home solutions market is highly immature and does require more seasoning. With more stable reimbursement initiatives, vendors will be able to better adjust their products, incorporate new features, and improve existing functionality to ensure best HaH outcomes for both patients and providers.

Vendors enabling the strategy include full stack and niche solutions:

Full stack examples: Medically Home, Biofourmis / Contessa, and Dispatch Health

Niche segments include: extending the EHR, RPM, wearables, delivery services, medical staffing, care management, patient outreach, and lab services.

Hospital at home market opportunity to reach \$300b by 2028



Note: Hospital at home market is still very immature and largely defined by available technologies to ensure patients' safety at home

Editorial: "Expect slow adoption over the next few years," said report author Elena Iakovleva, "as growing pains are worked through and reimbursement models catch up with proven demand. Given the market dynamics uncovered during this research, we anticipate adoption to accelerate after 2026. Payers will remain the largest customer of this segment, but health systems will make up an increasingly large share of the customer base as they see the positive financial benefits of extending their offerings through these technologies and services."

M&A and other transactions in consumer health segments

babylon mindmaze

Telehealth

Going private/merger

Babylon (UK) agreed to a recapitalization model that will delist it from the NYSE and merge it with digital neurotherapy company MindMaze (Switzerland). Babylon will receive \$34.5 million in interim funding in addition to an amendment of its \$300 million loan agreement from investment manager AlbaCore, which is overseeing the deal.



Insurance

Shutting down

Friday Health Plans announced it would shut down after more state regulators took action to limit the insurer's operations as it struggled financially. Friday had previously been operating in seven states, but the Denver-based insurtech didn't offer plans in Texas and New Mexico in 2023, and it was placed into receivership in Texas in March.

THIRTY MADISON **PILL CLUB**

Birth control

Asset acquisition

Thirty Madison, parent company of digital health brands Keeps, Cove, Nurx and more, purchased over 100,000 patient files and intellectual property from The Pill Club for \$32.3 million. Patients from The Pill Club can transition to receiving care through Nurx to ensure continuity of care and support the adherence required for effective birth control.

Digital primary care

Going private

Less than two years after the company debuted on the New York Stock Exchange, Babylon Health, a digital primary care provider, plans to be taken private as it continues to be saddled with mounting losses. It also entered into an agreement with AlbaCore Capital for a loan facility for up to \$34.5 million to support the company's plans to delist.



Telehealth

Acquisition

UK-based Doctor Care Anywhere Group will sell its Australian subsidiary to My Emergency Doctor for \$2 million. MED provides acute care after hours via video and phone across regional Australia. It has partnerships with 40+ healthcare services, including ambulances, primary health networks, residential aged care facilities, and more.



Telehealth

Acquisition

Australian Pharmaceutical Industries, a wholly-owned subsidiary of ASX-listed conglomerate Wesfarmers, is buying local telehealth business InstantScripts for \$91 million. The online health clinic offers telehealth consultations, online prescriptions, medical certificates, blood test requests, health management plans and specialist referrals.



Editorial: Optum's acquisition of Amedisys is notable as investment in the health home sector has been heating up. Baton Rouge, Louisiana-based Amedisys provides home health, hospice and palliative care services and has approximately 18,000 employees and 522 care centers in 37 states and the District of Columbia. The company expanded into the hospital-at-home market in 2021 when it acquired Contessa Health for \$250 million. UnitedHealth's victory in the bidding war was an unsurprising outcome given the higher offer and all-cash nature of the UnitedHealth bid.

Funding highlights in consumer health segments

| Company | Segment | Round/Total | What they do |
|-----------------------------|---------------------|-------------------------------------|--|
| Strive Health | Kidney care | \$166m <u>Series C</u> / \$386m | Provides at-home and virtual support for chronic kidney disease, end-stage kidney disease, dialysis and kidney transplant |
| DexCare | Appointment booking | \$75m <u>Series C</u> / \$145m | Software platform helps manage health system capacity and appointment booking, navigating patients to the most appropriate care setting |
| Upperline Health | Specialty care | \$58m <u>Venture</u> / \$137m | Identifies patients who are seeing specialists four or more times a year and provides them with an interdisciplinary care team that treats them at a clinic, in their home, or via phone |
| Octave | Behavioral health | \$52m <u>Series C</u> / \$86m | Offers in-person and virtual behavioral healthcare, with personalized care plans for couples, individuals, and families. Brick-and-mortar clinics in six states and Washington, DC |
| Carrum Health | Value-based care | \$45m <u>Series B</u> / \$96m | Value-based program addresses acute care scenarios like orthopedic surgery and cancer treatment; solution reduces unnecessary procedures by as much as 30% |
| Pomelo Care | Maternal health | \$25m <u>Series A</u> / \$41m | Specializes in providing comprehensive care to expectant mothers and infants throughout the entire journey, from preconception to pregnancy, birth, and one year postpartum |
| Midnight Health (Australia) | Telehealth | \$24m <u>Series B</u> / \$40m | Brands include telehealth platform Hub.health, women's health platform Youly.com.au, and men's health brand Stagger.com.au |
| Sami (Brazil) | Insurance | \$18m <u>Series B</u> / \$55m | Offers corporate health insurance plans; 18,000 current members with plans to expand that to 27,000 in 2023 |
| Caraway | Virtual care | \$17m <u>Series A</u> / \$27.3m | Virtual care startup focused on providing mental, physical, and reproductive healthcare for Generation Z; licensed to operate in ten states |
| Nelly (Germany) | Payments | \$16m <u>Series A</u> / \$21m | Solution fully digitizes the patient admin and payment system which can all be carried out on the patient's mobile phone |
| Sollis Health | Concierge care | \$15m <u>Series A ext</u> / \$47.4m | Membership includes access to every Sollis medical center nationwide, unlimited provider visits in-center or via on-demand virtual visits, routine lab work, wound care, and more |

Editorial: Other funding includes \$10m Seed for Mexico's **Clivi** (diabetes management), \$10m Venture for **DUOS** (senior assistance), \$7m pre-Seed for **Nutromics** (continuous diagnostic monitoring), \$5.5m Series A for the UK's **Olivia** (employee mental health), \$4.9m Seed for Austria's **nyra health** (digital therapy platform for neurological patients), \$4.9m Venture for France's **BrainTale** (brain care), \$4.25m Seed for **The Wound Company** (on-demand wound and ostomy care); \$3m NIH grant for **Sensydia** (non-invasive cardiac diagnostics); \$2.7m Seed for AccurKarida (clinical-grade ECG interpretation software); \$2m Seed for the UK's Upfront Diagnostics (stroke diagnosis); \$2m pre-Seed for Alba Health (child gut health), and \$1.7m pre-Seed for Rosarium Health (mobility challenges).



Et Cetera

Experts release new framework to evaluate digital health products

A group of healthcare researchers and health system leaders proposed a new framework to evaluate evidence for digital health products. The set of guidelines is called “Evidence in Digital health for Effectiveness of Interventions with Evaluative Depth” (Evidence DEFINED).

Framework seeks to provide hospitals, payers and trade orgs with a clear set of steps they can use to determine whether or not a digital health product is evidence-based and therefore suitable for their company to adopt. Authors created this after examining 78 existing frameworks designed for the assessment of digital health intervention evidence and found that none were specific enough to meet the needs of healthcare stakeholder orgs.

The Evidence DEFINED framework also aims to equip digital health vendors with a guide they can reference to ensure their solutions have the evidence needed for healthcare customers to adopt them. The new strategy was developed by experts from organizations such as Geisinger, Elevance Health, AstraZeneca and UCSF Health.

The Evidence DEFINED framework

| | |
|--|---|
| Screening | Each org defines and screens for absolute requirements (e.g., compliance with data privacy standards, appropriate reading levels, absence of clinical red flags, etc.) This avoids investing effort in DHIs that are not clinical candidates. |
| Apply an established method designed for non-digital products | Apply an established evidence assessment framework that was developed for non-digital interventions. Many stakeholder orgs already use such frameworks routinely for evidence assessment in non-digital domains. |
| Apply the EVIDENCE Defined supplemental checklist | Apply the Evidence Defined supplemental checklist to address considerations unique to DHIs or requiring greater vigilance in digital health. |
| Make actionable recommendations | Apply evidence-to-recommendation guidelines to generate a defensible recommendation regarding levels of adoption that may be appropriate for the relevant DHI. |

Editorial: A prior initiative, organized by the Digital Medicine Society (DiMe), developed a checklist to assess the evidence supporting fit-for-purpose biometric monitoring technologies (BioMeTs). Researchers built on this work to develop a framework that may help organizational stakeholders assess digital health interventions. The goal of the framework is two-fold: (1) To facilitate rigorous and rapid digital health evidence assessment within stakeholder orgs, thereby encouraging adoption of DHIs that are most likely to improve health outcomes; (2) Provide guidance to digital health solutions providers (DHSPs) who wish to generate evidence that drives adoption of their products.

AI could tackle the greatest challenges in healthcare and drug design

As AI becomes increasingly able to function as a technical expert, there are opportunities to extend the abilities of existing providers to deliver care at a much lower cost. If AI can be implemented with empathy, it can engender engagement and maintain compliance with clinical recommendations, as well as mitigate clinician burnout.

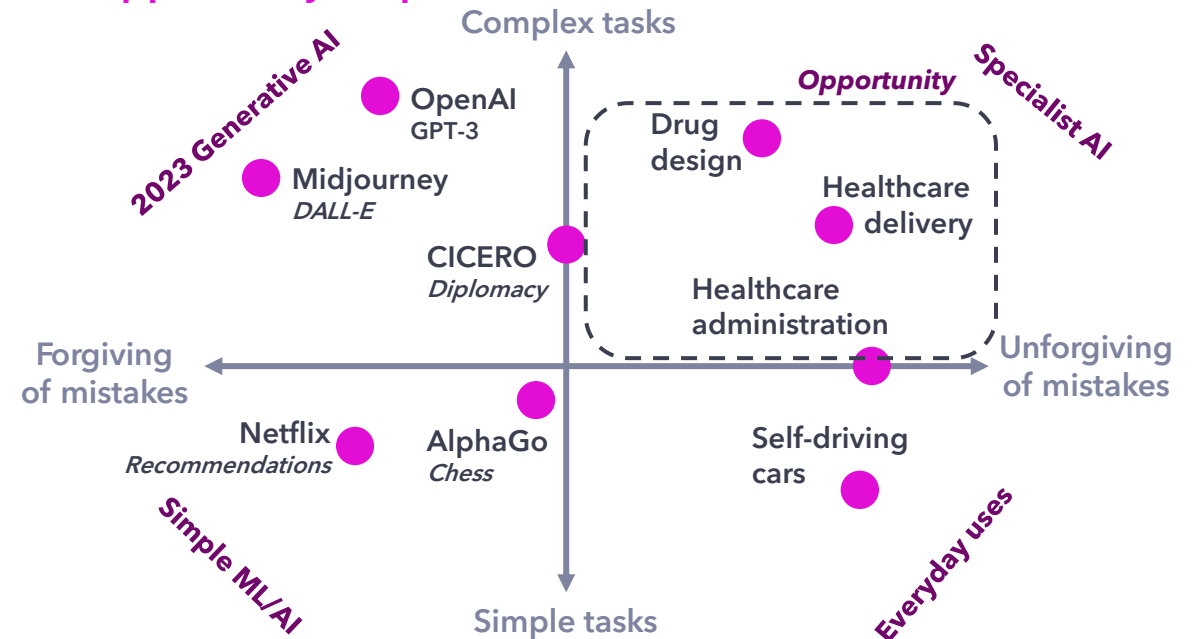
As more care becomes AI-enabled, AI has the potential to democratize healthcare, giving the best services to everyone. AI can amplify existing wisdom, meaning that patients are more likely to receive the correct diagnosis and treatment plan earlier.

To solve the greatest challenges in healthcare and life sciences, we need specialist AIs in specific domains more than an overarching AI that can do anything an average human can do. We imagine an array of specialist AI companies, designed with specialized large models, built by specialized teams.

AI can understand biology beyond the abilities of human scientists. This allows research to be scaled far beyond the current model (which primarily relies on serendipitous discovery enabled by hours of human labor in the lab).

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horowitz

AI opportunity map



Editorial: Analysts at Andreessen Horowitz opine that this new technological revolution won't happen overnight but will take 10 to 20 years in a fashion that all of the stakeholders can become aware and comfortable with the transition. "We see AI turning every nurse into an inpatient superhero and pushing the industry to consider what it would mean if every patient had an always-on, professionally trained companion that could converse for as long as they want, at a cost of just cents per hour," they write. "On the therapeutics side, we've been following the development of therapeutics aimed at increasing health span; AI-enabled research into better antibody therapies to tackle some of humanity's worst conditions; and R&D that goes beyond the abilities of human scientists."

Will Doctolib IPO in 2024 and become Europe's first \$10b public digital health company?

Doctolib is a leading digital healthcare platform in Europe, and it has seen rapid growth in recent years.

The company has over 60 million users in France, Germany, and Italy, and it is expanding into new markets

The company is well-positioned for growth, and is one of the most anticipated digital health IPOs

Doctolib started as a scheduling platform for doctors, but it has since expanded to offer telemedicine, messaging, and back-office management

A Doctolib IPO could take a number of forms, but a few possible scenarios include: The company could go public at a valuation of \$10 billion or more, the company could raise \$1 billion or more in its IPO, the company could list on the Euronext Paris stock exchange

Doctolib does not need to launch in the UK before an IPO, however, it would be a strategic move for the company to do so, as the UK is a large and growing market for digital health

The UK market is already crowded with other digital healthcare platforms, including Babylon, Patient Access, and Zocdoc, all of which offer similar services to Doctolib, with an established presence in the UK

The UK is a major driver of digital health growth, and the country is expected to account for 4.8% of the global market by 2027

The company's IPO valuation is difficult to predict but some analysts have estimated that the company could be valued at around \$10 billion or more in an IPO

Timeline of key milestones in Doctolib's history

| | |
|------|--|
| 2013 | Founded in Paris, France |
| 2014 | Launches in Germany |
| 2016 | Launches in Italy |
| 2017 | Raises €100 million in Series C funding |
| 2018 | Launches its telemedicine platform |
| 2019 | Raises €150 million in Series D funding |
| 2020 | Launches its messaging platform |
| 2021 | Raises €250 million in Series E funding |
| 2022 | Raises \$549 million in Series F funding |

Editorial: The analysis is courtesy of London-based digital health thought leader Lloyd Price. While there has been no official announcement yet about Doctolib's IPO date, there have been reports that the company is considering an IPO in 2024. In March of last year, Doctolib raised \$549 million in a funding round that valued the company at \$6.4 billion. This funding round was led by Eurazeo and Bpifrance, and it was seen as a sign that Doctolib is preparing for an IPO.

Companies mentioned in this report

| | | | | | | | |
|---------------------|-------------------------|------------------------|---------------------|--------------------|---------------------|--------------------|--------------------|
| 1up Health | binx health | Crystal Run Healthcare | Google | KPMG | Nomad | Salesforce | Tricog Health |
| 3M | Biofourmis | CVS | Grapefruit Health | Lark | Norstella | Saluda Medical | TriNetX |
| Accenture | BioSerenity | Deloitte | Greenway Health | LexisNexis | Olive | Sandoz | Truepill |
| Access TeleCare | Blue Note Therapeutics | Dario Health | Hatch | Lightbeam Health | Omy Laboratories | Scan.com | Trusted Health |
| AccessOne | Bluestream Health | Dispatch Health | Headspace Health | Livongo | Optum | ScanSTAT | Truveta |
| Adobe Systems | Bpifrance | Doc Abode | Headway | Locus Health | Oracle | Scene Health | Twentyeight Health |
| Advantmed | Bright.md | DoseSpot | Health Catalyst | Lumeon | Oshi Health | ScriptDrop | TymphaHealth |
| Aetna | CareAllies | Doxy.me | Health Fidelity | m.Doc | Osigu | Secure Exchange | Uber Health |
| Akili | Caregility | Dozee | HeartFlow | Mahana | Oura | SentiAR | Updox |
| Aktiia | CarePayment | Dropstat | Hopper Health | MCG Health | Owkin | Servinte | Vatica Health |
| Albertsons | Caristo Diagnostics | eClinicalWorks | HRS | MDLIVE | OXOS Medical | Sidekick Health | Veradigm |
| Alma | Cedar | eConsult | Human API | MedArrive | Paloma Health | SilverCloud Health | Verisma |
| Alphabet | Cedar Gate Technologies | Elation Health | Hypercare | MedInsight | Paradigm | SimpleHealth | Verizon |
| Amazon | Censinet | ELLKAY | Hyphen | MedRhythms | Pareto Intelligence | Sondermind | Vida |
| Amelia Virtual Care | CenterX | Engage Technologies | Inato | MedShift | Path | Spring Health | Violet |
| Amwell | CGM | Epic | Incredible Health | Memora Care | PathologyWatch | Sprinter Health | Visionable |
| Andor Health | Change | Epic Sciences | InformMe | Mend | Pear Therapeutics | SQUID iQ | VSee |
| Apixio | Chiefly | Episource | Inovalon | Meta | Phlo | Stellar Health | Vytalize Health |
| AppliedVR | Ciox | eVisit | Instacart | Microsoft | Prodigo Solutions | Story Health | Walgreens |
| Apprentice.io | ClearBalance | EXL | IntelyCare | MilkMate | Propeller Health | Supportiv | Watkins-Conti |
| APX Platform | Clearday | EY | InterSystems | Momo Medical | Prosoma | Sweetch | Waystar |
| Arcadia | Click Therapeutics | Felix | IoT Solutions Group | Monument | Proximie | Talix | Welldoc |
| AT&T | Clinerion | Femspace | Itiliti Health | MOONHUB | PwC | Tally Health | Wellth |
| athenahealth | Clue | FinThrive | John Snow Labs | Moxe | Recuro Health | Tegria | Xealth |
| Augmedix | Cofactor Genomics | Florence | Johnson & Johnson | MRO | RhythmScience | Teladoc | XRHealth |
| Availity | Cohere Health | Flyte | Jude | Mytonomy | Risant Health | Tempest | Xsolis |
| Azara Healthcare | Compassly | Gartner | Kaia Health | Navenio | Riva | Tempus | Zimmer Biomet |
| Babblevoice | Cortica | Gather Health | Kaiser Permanente | Neteera | Rocket VR Health | Teton.ai | Zocalo |
| Best Buy | Cost Plus Drug | Geisinger | Kare Mobile | NextGen Healthcare | Rose Health | The TeleDentists | |
| Better Therapeutics | Cotiviti | GHX | Kareo | Nielsen | RxPlace | TreatRx | |